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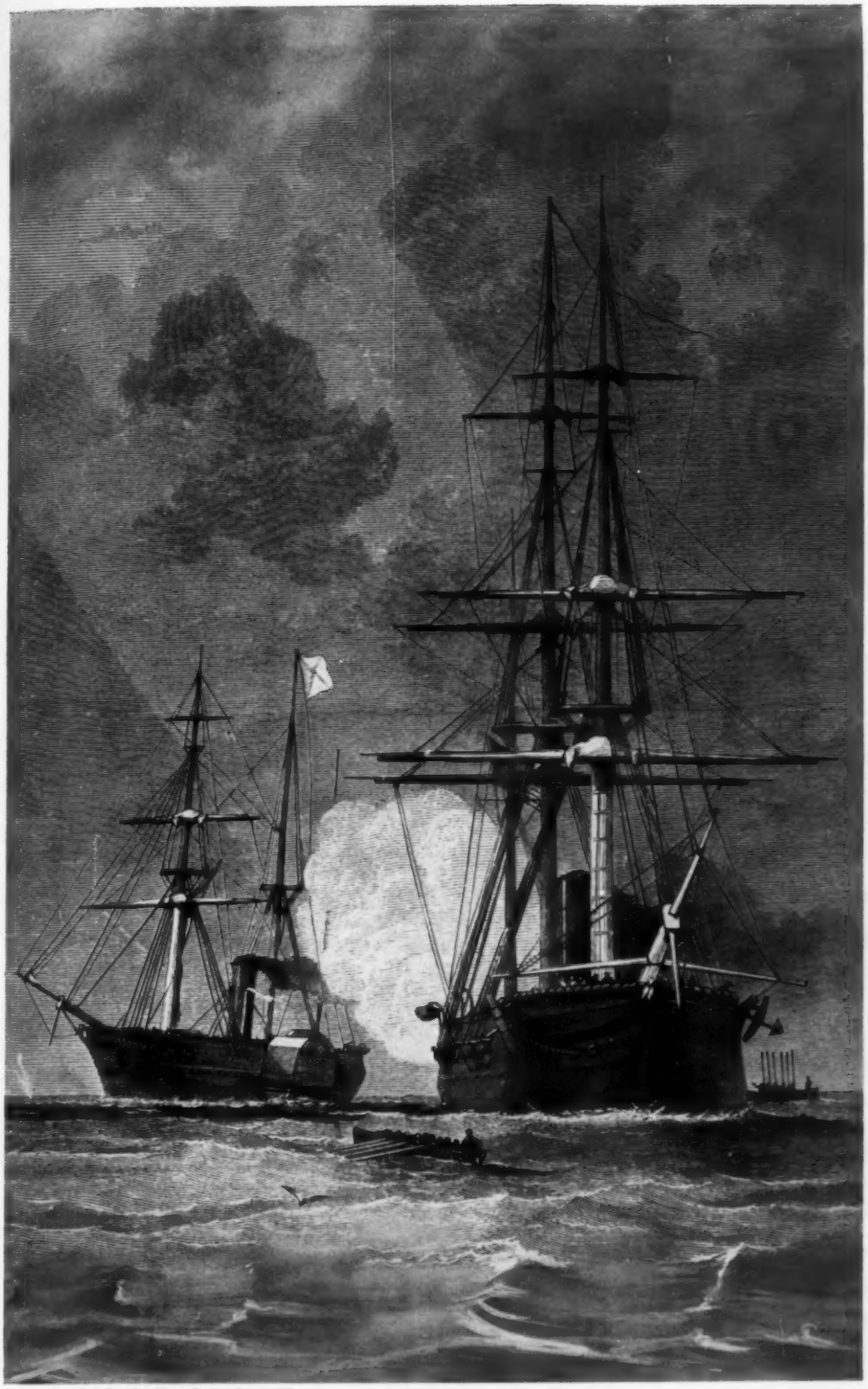


From a print in the Naval Academy Museum

THE U.S.S. *SAN JACINTO,* CAPTAIN CHARLES WILKES
Stopping the British mail steamer *Trent* to seize the Confederate commissioners, Mason and Slidell, off Cuba, November 8, 1861.

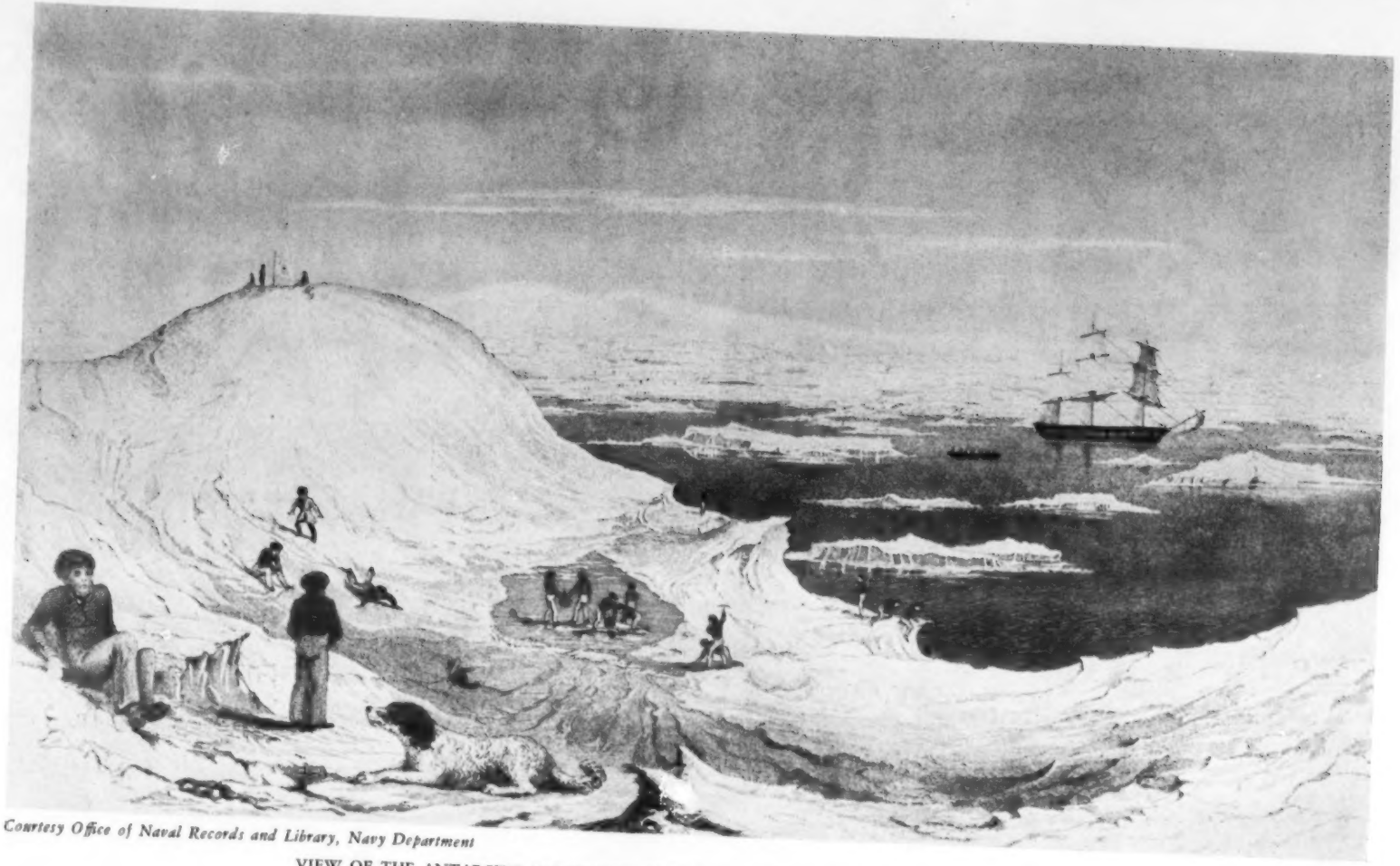
Courtesy Office of Naval Records and Library, Navy Department

U.S.S. *PEACOCK* IN CONTACT WITH ICEBERG

U.S.S. *PEACOCK* IN CONTACT WITH ICEBERG

Courtesy Office of Naval Records and Library, Navy Department

U.S.S. *VINCENNES* IN DISAPPOINTMENT BAY



Courtesy Office of Naval Records and Library, Navy Department

VIEW OF THE ANTARCTIC CONTINENT, U.S.S. *VINCENNES*, WILKES'S EXPEDITION, 1838-42

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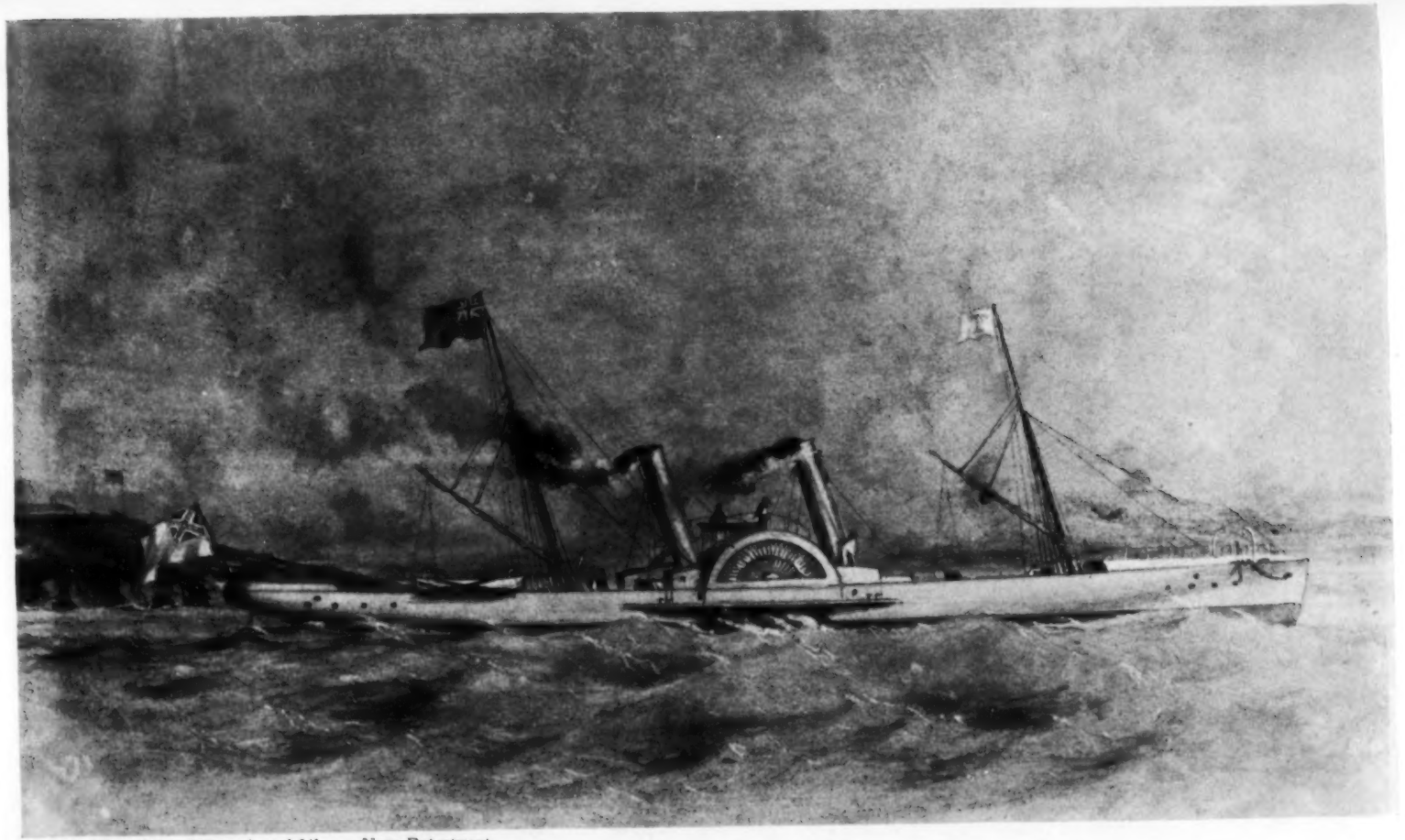
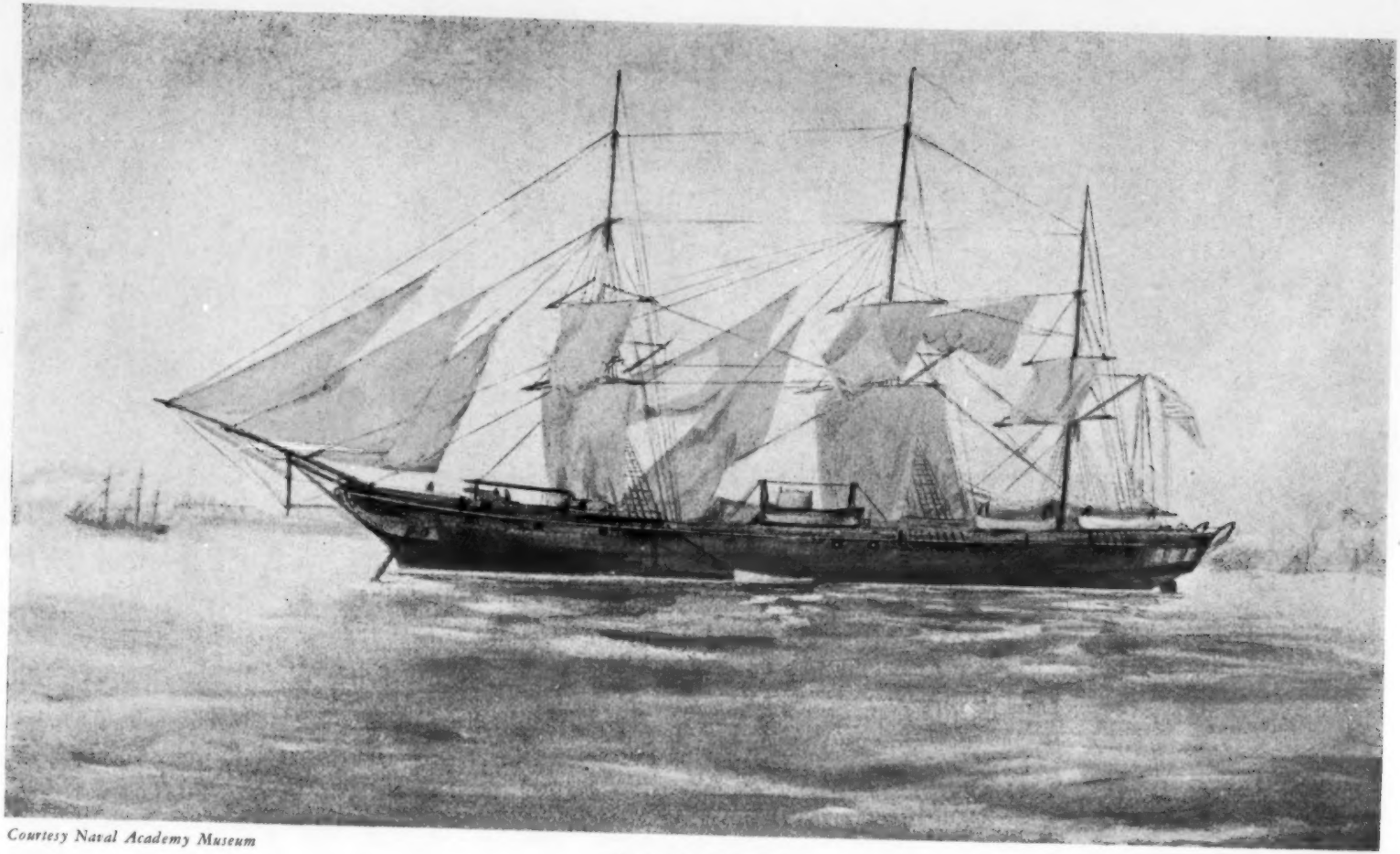


Courtesy Office of Naval Records and Library, Navy Department

BLOCKADE RUNNER *LYNX*, 1864



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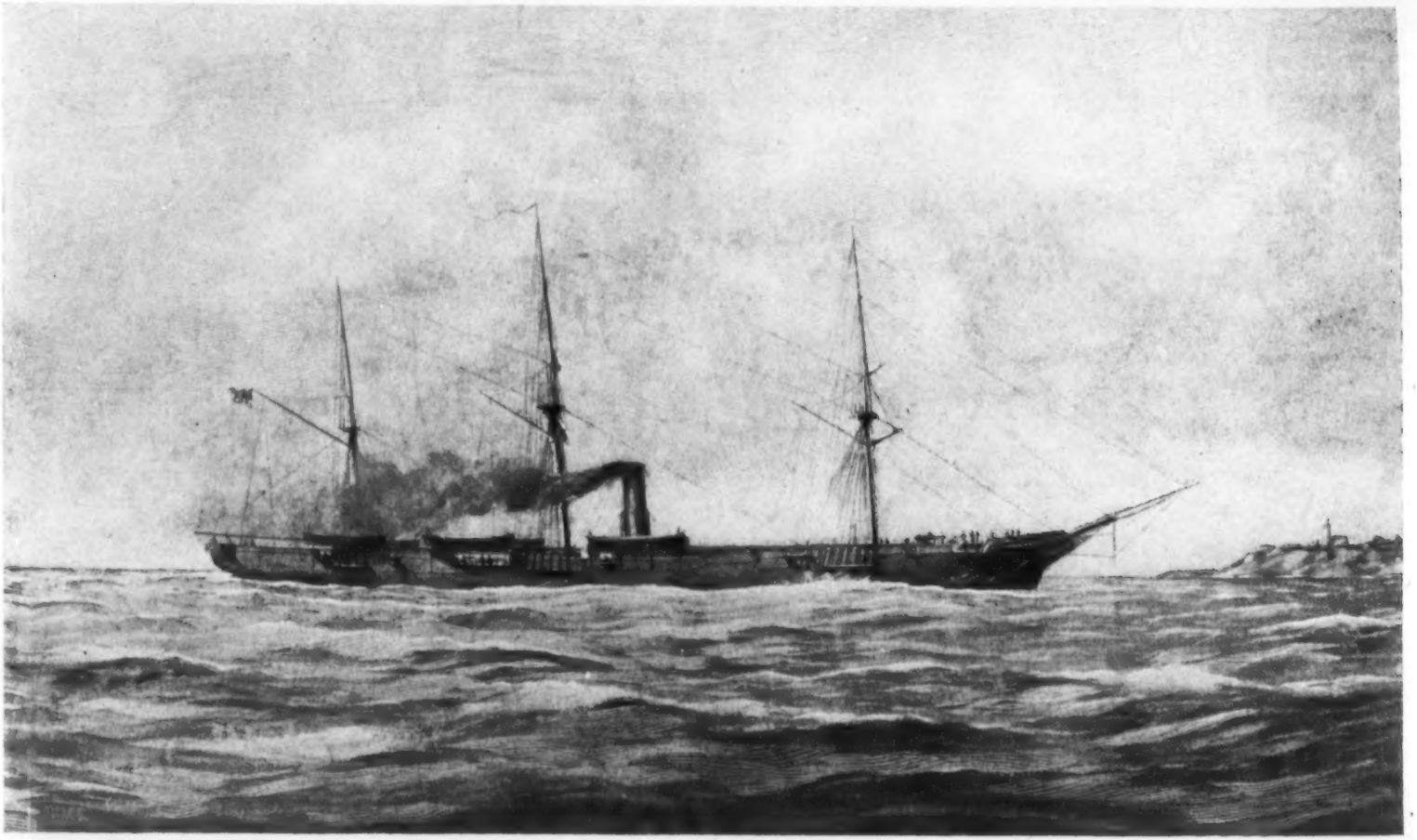

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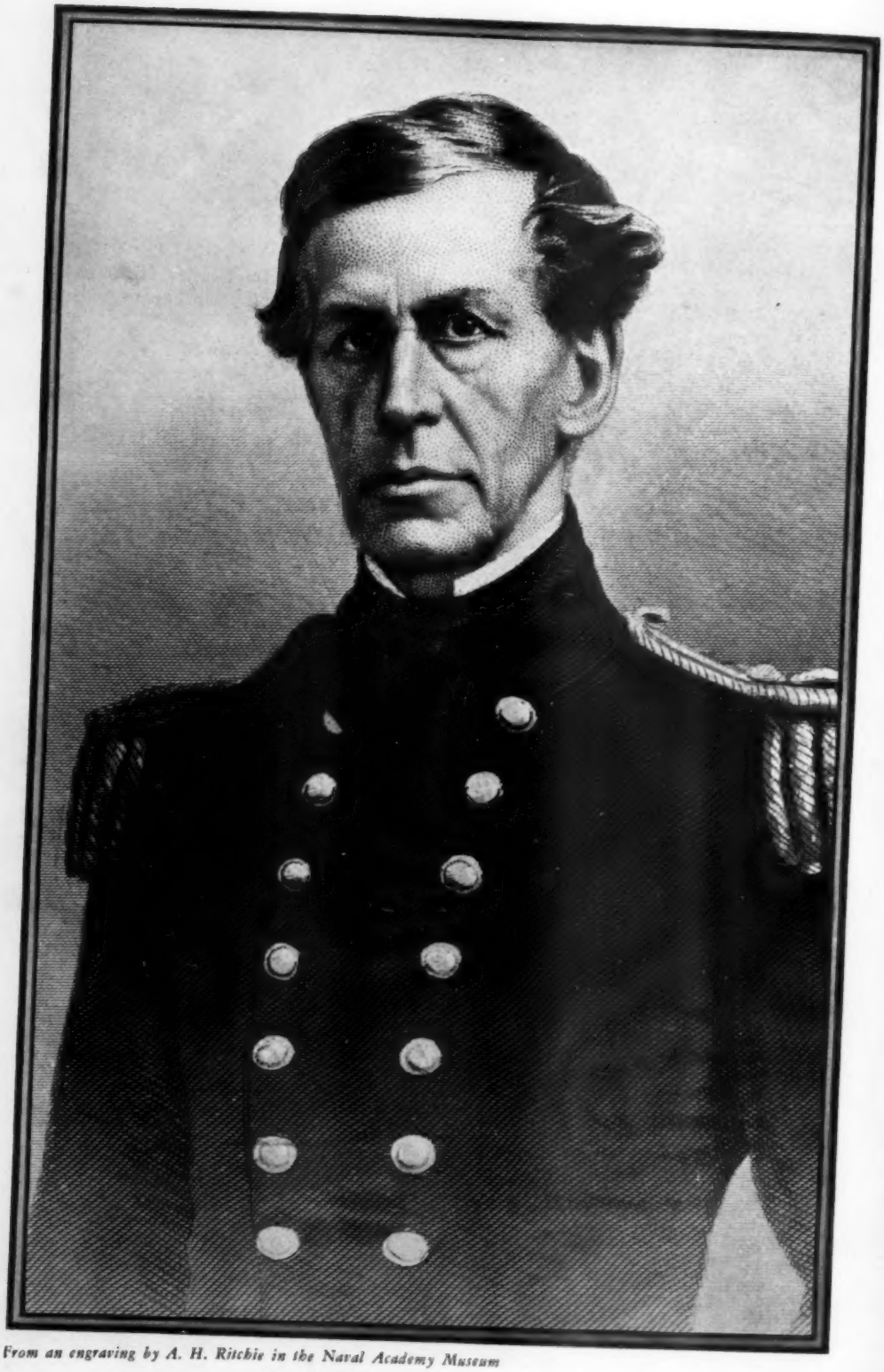

From an engraving by A. H. Ritchie in the Naval Academy Museum

CAPTAIN CHARLES WILKES, U. S. NAVY

UNITED STATES
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CHARLES WILKES—TURBULENT SCHOLAR OF THE OLD NAVY

By JAMES D. HILL

CHARLES WILKES had all the attributes, qualities, and characteristics commonly associated with the classical, wooden-ship sea dog. In fact, when his record is examined, it is apparent that he had more than was essential to success in his profession.

Though his long, rugged, angular frame was perhaps the despair of more than one naval tailor, he strode the quarter-deck with the militarily erect austerity of the deep-sea martinet that he truly was. His features were in perfect harmony with his figure—long, irregular, strong chin and mouth, piercing eyes, and a forehead of medium height surmounted by a shock of unruly hair. In addition to being a stern, rigid disciplinarian, he was possessed with a consuming ambition and an aggressive initiative that shirked no responsibility and carried him straight through minor obstacles and technicalities to whatever objective he chose as his goal. With it all he was a scholar. As a scientist he was at one time considered a worthy rival of the great Maury. He shares with Columbus the rare honor of having proved the presence of a continent beyond a little explored sea! With a little less turbulence in his disposition and a little more luck in chasing Confederate cruisers he might have achieved admission to that small group of men whom posterity has dubbed "great admirals."

Admittedly the last sentence of the foregoing paragraph smacks of an anticlimax. So does the last year or two of Wilkes's active career. In view of such a galaxy of talents and attainments, however, one might pause to wonder concerning the details connected with his failure to reach that goal of every midshipman, past and present. Let his record speak for itself. And keep in mind at all times that regardless of the peace-time achievements of a naval officer, his claim to fame as such must rest upon his war record. War is his profession.

Charles Wilkes was born in New York only a year or two before the advent of the nineteenth century. He entered the Navy as a midshipman in 1818, and, after a particularly promising sojourn in that relatively insignificant rank, he was commissioned a lieutenant in 1826. By 1833 he had seen his full share of sea duty, which included service on two exploring expeditions, and he was given shore duty in Washington, D.C., as superintendent of the Depot of Charts and Instruments.[1] His duties in this position necessitated his checking the accuracy of all instruments that passed through the depot. This seems to have given a free rein to a natural inclination for science, and he made the most of it. He felt the need of a national observatory, hence he constructed "at his own expense

[1] Hamersly, Louis R., *The Records of Living Officers of the United States Navy and Marine Corps* (Philadelphia, 1870), 24-5.

a small observatory, fourteen feet long, thirteen feet wide, and ten feet high," in which he installed a five-foot transit instrument that had originally been procured for the Coast Survey.[2] Therein is demonstrated a typical Wilkes characteristic. While the Jacksonians, then in power, were still referring to John Quincy Adams's "lighthouses of the skies"[3] with gusty guffaws and serious denunciations of such "internal improvements" by the national government as unconstitutional, Lieutenant Wilkes was quietly building one on his own initiative.

In 1838 he was tendered the command of a long contemplated exploring expedition to the Pacific, a billet, by the way, that had been refused by some of the higher ranking officers of the Navy. The scientific-minded lieutenant, however, accepted and began organizing the expedition with characteristic vigor. It consisted of the sloops-of-war *Vincennes,* Lieutenant Wilkes, who was to function also as flag officer, and *Peacock,* Lieutenant W. L. Hudson; the gun brig *Porpoise,* Lieutenant C. Ringgold; the supply ship *Relief,* Lieutenant J. K. Long, and two small tenders commanded by a passed midshipman and an acting master; truly a rather pretentious flotilla to be under the command of a mere lieutenant.

From the beginning difficulties were encountered. The instruments and supplies to be carried, not to mention the conditioning of the squadron, gave Lieutenant Wilkes much concern. Then the personnel contributed its share of the trouble. Neither officers nor men had much stomach for such a protracted cruise as this promised to be. Lieutenant Hudson refused to go on the grounds that his name stood higher on the list of lieutenants than did that of the flotilla commander, who was, therefore, his junior in rank. Mr. Hudson was soothed into acquiescence when, for his especial benefit, a general order was issued by the department to the effect that the expedition was thereby divested of all military character as its objectives were purely scientific.[4]

The general order notwithstanding, Lieutenant Wilkes did not permit officers or men to get under the impression for a moment that they were not still in the Navy—the old, rigid, hard Navy at that. And there were times when they must have felt themselves engaged in activities that were decidedly military in character. Before reaching Cape Horn, he exercised his temporary seniority over Lieutenant Hudson to the tune of a sharp reprimand because of negligence with regard to the shore-boat routine of the *Peacock.*[5] Later, he ordered back to the States, to be dismissed from the service, two midshipmen who sought to settle a private affair on the so-called field of honor; but upon the presentation of a petition from the other officers of the squadron, he had them restored to duty. In short, he dealt quickly and summarily with officers and men who found his iron discipline irksome. He reached the climax, perhaps, in Honolulu Harbor, where he broke and cashiered an acting master's mate, and had flogged a number of unruly sailors and marines on board the *Peacock,* while the crews of the other ships were piped to the rails to witness the spectacle.[6]

In the tender light of the twentieth century, our modern milk-fed, humanitarian citizenry would at once brand him as a brute. In reality he was not. Mr. Wilkes and the men with whom he dealt were the products of a vastly different age. His discipline and methods had the sanction of the customs of the Navy in which he served. He did his duty as he saw it, though he may—his enemies, and he had not a few before the four-year voyage was over, said he did—have overstepped his authority at times. However, he attained his objective. He had discipline.

All of his harshness did not fall upon those under his command. When some South Pacific islanders murdered Lieutenant Underwood and Mr. Wilkes Henry, the latter a junior officer and a nephew of the commander, a landing party of marines and sailors was ordered ashore, and the en-

[2] Paullin, Charles O., "Early Movements for a National Observatory, 1802-1842," *Records of the Columbia Historical Society,* XXV (1923), 49.

[3] President Adams, in his first congressional message, had so referred to observatories and recommended their establishment by the Federal government. Such poetic affectation was too good to be passed up by the proudly uncouth Jacksonians in Congress, who seized the expression and gave it a satiric vogue far beyond the public interest in naval observatories.

[4] Wilkes, Charles, *Narrative of the United States Exploring Expedition during the years 1838, 1839, 1840, 1841, 1842* (Philadelphia, 1849), I, 351-3.

[5] *Ibid.,* 433.

[6] *Ibid.,* IV, 511.

tire native village felt the weight of the white man's vengeance, which was excessively severe when viewed in its mildest light.[7]

Shorn of these unpleasantries and viewed in the light of its scientific objectives, the expedition was a brilliant success. In addition to Mr. Wilkes's minutely detailed and ably presented five-volume narrative,[8] not to mention his official reports and those of the staff of scientists attached to the squadron, the attainments of the expedition have been so well reviewed by recent authors and scientists that there is no justification for a full repetition thereof here.[9]

Though time has verified the essentials of the scientific claims and facts presented by Wilkes on his return from the four-year cruise, he did not receive the credit that was due him. He had visited and checked the position of hundreds of obscure islands; had carefully collected data on their history, manners, customs, and American trade possibilities with them; had observed the movements of the Pacific Ocean currents, and at the same time located the favorite cruising grounds of the all-important whales; had carefully compiled information, garnered by a thousand observations, on the origin and movements of the winds; and, to crown it all, he had, with unsurpassed seamanship and accuracy in navigation, over the official protests of medical and line officers, and in the face of adverse ice and weather conditions, established the presence of a new continent by sailing 1,700 miles along its bleak, ice-bound coast.[10] Instead of the honors that were due him, he got a court-martial. It was an outgrowth of the enmities created on the voyage. He was charged with having exceeded his authority, unnecessary harshness, falsehood, and sundry discreditable acts such as "while yet a lieutenant wearing the uniform of a captain."[11]

The long tedious court-martial brought him official vindication on all charges but one, the illegal punishment of subordinates, for which he received a reprimand. Then an attack on his record as an explorer developed from an entirely unsuspected quarter. In 1847, Captain J. C. Ross, R.N., gave to the public his *Voyage to the South Seas* in which he not only ignored Wilkes's contributions to antarctic knowledge, but also cast reflections on his veracity as a scientist. As a climax to this injury, Captain Ross expanded the apparently tangible results of his own voyage by cribbing from a letter and a chart that had been generously and unexpectedly given to him by Lieutenant Wilkes when they met in Sydney, after Wilkes's return from his famous coasting voyage along Antarctica. As a result, Lieutenant Wilkes's work was under a cloud to the day of his death, and as late as 1912 we find American scholars taking up the cudgels in his behalf.[12]

Truly, the wrong ought to be corrected; nevertheless, the injured Wilkes, partially at least, deserved the rough handling he received at the hands of the English geographers. All of it came from his having given the letter and chart to Captain Ross. Viewed by the Simon-pure scholar, this act of aiding a fellow-explorer by putting at his disposal the most recent data available was in keeping with the scientific spirit and therefore was admirable and laudable. But Lieutenant Wilkes did not have the right to indulge in such amenities of the scientific brotherhood. He was a naval officer commanding Navy ships and men, sailing under explicit orders from the Navy Department, a very pertinent paragraph of which enjoined him to "prohibit all under your command from furnishing any person not belonging to the expedition with information which has reference to the objects or proceedings of the expedition."[13] Admittedly the phrase "all under your command" left him, as the commander, some discretionary powers on this point, but his act was unquestionably out of harmony with his orders. But Wilkes, for some

[7] Krout, Mary H., "Rear Admiral Charles Wilkes and His Exploits," PROCEEDINGS United States Naval Institute, L (1924), 410.

[8] See footnote 4.

[9] Comparatively recent contributions to this phase of Wilkes's work are: Balch, Edwin S. *Antartica*, Philadelphia, 1902; Feipel, Louis N., "The Wilkes Exploring Expedition," United States Naval Institute PROCEEDINGS, XL (1914), 1323-50; Greely, A. W., "American Discoveries of the Antarctic Continent," *National Geographic Magazine*, XXIII (1912), 298-312, and Pillsbury, John E., "Wilkes and D'Urville's Discoveries in Wilkes Land," *Ibid.*, XXI (1910), 171-3.

[10] Greely, A. W., *op. cit.*, 305.

[11] Pillsbury, John E., *op. cit.*, 172, also Krout, Mary H., *op. cit.*, 412.

[12] Greely, A. W., *op. cit.*, 307-9.

[13] *Ibid.* (Quoting Wilkes's orders), 304.

reason or another, often failed to take seriously general instructions from the department.

With the court-martial and reprimand things of the past, Lieutenant Wilkes took up the routine assignments he had experienced prior to his colorful Pacific cruise. In July of the following year, 1843, he was raised to the grade of commander.[14] In addition to his normal duties, much of his time was necessarily spent in preparing for publication his elaborate reports of the expedition; his five-volume "narrative, already mentioned, which was given to the public in 1849; and his *Theory of Winds*, which came from the press in the early fifties. In 1855 he was promoted to captain.[15]

The early months of the Civil War found him on duty with the African squadron engaged in the suppression of the slave trade. The twenty years since he had skirted the coast of Antarctica had wrought but little change in the veteran seaman, though he had already reached the supposedly mellow age of sixty-two. But there was nothing mellow about him. He was still physically vigorous, efficient, full of initiative, and ambitious. Nor had his ideas of discipline lapsed. In fact the martinet propensities of younger days had been bolstered up by an "eccentric and independent . . . disposition,"[16] to produce a combination that probably approached the characteristics of a truly cantankerous old sea dog, though he was very pleasant to those who enjoyed his confidence.

When the seriousness of the secession movement was fully realized by the Lincoln administration, the best of the far-flung cruisers were ordered home. As a part of this movement, Flag Officer Inman, commanding on the African station, transferred Captain Wilkes to the steam sloop *San Jacinto*, then temporarily commanded by her executive officer, Lieutenant D. McN. Fairfax. "You will then make the best of your way with the *San Jacinto* to Monrovia, Liberia, and thence to Philadelphia, Pennsylvania. . . . You are authorized to stop where it may be necessary for coal or other supplies."[17]

After the usual delay typical of that age of slow communications, the *San Jacinto* arrived at Fernando Po from St. Paul de Loando, and Captain Wilkes took command. In accordance with his instructions, he proceeded to Monrovia. Toward the last of September, he was at the Cape Verde Islands, where newspapers informed him of President Davis's having issued letters of marque to privateers, which were then preying upon Union commerce in the West Indies. Thereupon he decided to cruise by way of those islands before reporting in at Philadelphia.[18]

The *San Jacinto* reached St. Thomas October 13, where Captain Wilkes found the *Powhatan*, Commander D. D. Porter, and the *Iroquois*, Commander J. S. Palmer, in search of the C.S.S. *Sumpter*. While they were taking on supplies, an English brig brought news of the marauder to southward. With this information, Captain Wilkes at once exercised his authority as senior officer present. He sent the *Iroquois* to cruise among the Lesser Antilles, while he cruised westward along the southern shores of the Greater Antilles to Cienfuegos, Cuba, the route the *Iroquois* would have followed, had not Wilkes interposed.[19] The *Powhatan* was to make a similar search along the northern shores of Porto Rico, Santo Domingo, and Cuba to Key West. Following events justified this diversion of the *Iroquois*, for a few weeks later Commander Palmer actually caught and blockaded the phantom *Sumpter* in St. Pierre Harbor, Martinique, only to be outwitted by the elusive Semmes,[20] subsequently of *Alabama* fame.

After a fruitless search, the *San Jacinto* reached Cienfuegos, October 23. There Captain Wilkes heard news that led to a decision to linger two weeks longer in the West Indies before "making the best of" his "way with the *San Jacinto* . . . . to Philadelphia" as Flag Officer Inman had ordered.

Since early in October, news of the appointment of Messrs. Mason and Slidell as

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[14] Hamersly, L. R., *op. cit.*, 24-5.

[15] *Ibid.*

[16] Harris, T. L., *The "Trent" Affair* (Indianapolis, 1896), 98.

[17] Inman to Wilkes, August 9, 1861, *Official Records of the Union and Confederate Navies in the War of the Rebellion*, Series I, I, 64. Hereafter cited as Official Records.

[18] Harris, T. L., *op. cit.*, 97-8.

[19] Official Records. Series I, I, 119-20.

[20] Palmer to Secretary of Navy Welles, Nov. 25, 1861, *Ibid.*, 213-4; Semmes to Secretary of Confederate Navy Mallory, Jan. 16, *Ibid.*, 644-7.

"commissioners" to England and France respectively by President Davis, had been known in the North. It was also known that they intended to slip through the blockade off Charleston and proceed to Europe on the fast converted merchantman, C.S.S. *Nashville*. The blockaders off that port were increased and such a close watch kept upon the chosen steamer that the commissioners gave up hopes of getting to Europe in that manner, and chartered the privately owned, 15-knot blockade runner *Gordon* to carry them to Nassau.[21] For some reason the name of this craft was changed to *Theodora* immediately after her charter for this trip. She carried them through the blockade, Saturday, October 12, and the following Monday afternoon at four she was off Nassau. Without landing, it was learned that there was no connecting steamer between that port and St. Thomas, as they had thought there would be at the time of their departure. The *Theodora* then laid a course for Havana, but a coal shortage forced her to put into Cardenas, October 16. Thence the commissioners, accompanied by much publicity, proceeded overland to Havana.[22] A few days later the *Nashville* got through the blockade and started on a commerce-destroying cruise to the English Channel. Under the impression that she was carrying the diplomatic agents, Flag Officer Dupont dispatched the U.S.S. *James Adger*, Commander Marchand, to Europe in hopes of intercepting her outside one of the channel ports.[23]

This was the status of affairs when Captain Wilkes reached Cienfuegos and decided to take a part in this international game of hide and seek. While "at Cienfuegos . . . I determined to intercept them [the commissioners and their secretaries] and carefully examined all the authorities on international law to which I had access, viz., Kent, Wheaton, Vattel, besides various decisions of Sir William Scott and other judges of the admiralty court of Great Britain, which bore upon the rights of neutrals and their responsibilities." He had found that dispatches were contraband of war and made a neutral ship carrying them, if it were known to her officers, liable to seizure. He then hypothesized, without a case in point to support such a supposition, that the Confederate agents, not being accredited diplomats but merely rebels, constituted living "embodiment of dispatches." Hence, he concluded that a neutral carrying them was subject to capture.[24]

His first desire, however, was to capture the *Theodora* on her return trip. As soon as he had filled his coal bunkers, water tanks, and storerooms, he sailed for Havana "with all dispatch." There he found that he was too late for the *Theodora*, but that the commissioners were still the social lions of the city, and would not leave until November 7, when they were to take passage on the English mail steamer *Trent*, plying regularly between Vera Cruz and St. Thomas with Havana as a call port. At St. Thomas, the *Trent* made connections with the regular West India packet for England. At no time did she enter Union or Confederate ports. In addition to this information, Wilkes received news of the Union amphibious expedition then in operation against Port Royal, and he began to make plans for going by there, after he had captured the *Trent*, in hopes of getting in on any action the men-of-war might find off that port.[25]

With this full knowledge of the commissioners' itinerary, Captain Wilkes made up his "mind to fill up with coal and leave the port as soon as possible, to await at a suitable position on the route of the steamer . . . to intercept her."[26] After leaving Havana he still had several days to wait before the arrival of the *Trent* in those waters. He spent the time cruising along the Cuban north coast and stopping merchantmen in hopes of hearing something of the *Sumpter*. Then it occurred to him that in spite of the comparatively narrow waters of the Old

[21] Mason to Confederate Secretary of State Hunter, Oct. 9, *Ibid.*, 148-50.

[22] Mason to Hunter, Oct. 18, *Ibid.*, 151-2.

[23] Dupont to Welles, Oct. 16, *Ibid.*, 115, and Marchand to Welles, Nov. 6, *Ibid.*, 129.

[24] Wilkes to Welles, Nov. 16, *Ibid.*, 143.

[25] Fairfax, D. McN., "Captain Wilkes's Seizure of Mason and Slidell," *Battles and Leaders of the Civil War* (New York, 1884-7), I, 140.

[26] Wilkes to Welles, Nov. 15, Official Records, Series I, I, 130. The orders Captain Wilkes gave to his boarding officer, as will be shown later, and the presence of engineering officers and firemen in the boarding party indicate that he really intended them to be members of a prize crew for carrying the *Trent* into port for adjudication. The letter here quoted was written a week after the episode and in it Captain Wilkes expressed his intentions to agree with what he actually did.—See Official Records, Series I, I, 131-2 and 133-7.

Bahama Channel, the *Trent* might slip by him under cover of darkness. Nursing this fear, he hastened to Key West where he expected to find the *Powhatan* or some other man-of-war that he might order out to help patrol the path of the mail steamer.[27]

In the meantime he had confided his intentions to Lieutenant Fairfax. This officer opposed the entire scheme as being contrary to American interpretations of international law, and particularly hazardous to the Union cause should England, with her strong Navy, consider such an act sufficient cause to enter the war in favor of the Confederacy. When he found, however, that his chief had fully made up his mind, he stopped urging his views upon the captain. He took advantage of this trip to Key West, however, to reopen the question and to suggest that it might be well to consult Federal Judge Marvin, an authority on admiralty law, as to the legality of such a seizure. Captain Wilkes did not consider it worth while,[28] however, and when he found no men-of-war at Key West, he hastened back to the Cuban coast to keep the vigil alone.

He ran eastward along the north coast to a position off Paradon light, some three hundred miles east of Havana. At this well-chosen point, where the Old Bahama Channel contracts to a width of fifteen miles, he cruised slowly back and forth. According to the known speed of the *Trent*, Captain Wilkes reasoned that she should be off Paradon light at high noon, November 8. At 11:45, the lookout reported her smoke to westward, and the crew of the *San Jacinto* was sent to battle stations. The customary blank shot was fired as a signal to heave to. This was disregarded. The second shot was a shell, which exploded squarely in the path of the steamer. Naturally, Captain Moir, of the *Trent*, hove to.[29]

Mr. Fairfax, second in command, for the moment became the leading character in the episode. That officer, still thoroughly disconcerted over the possible outcome of the affair, launched himself upon a plan of action calculated to nullify in some measure the rashness of his captain. In harmony with this plan he had demanded, as the senior lieutenant, the honor of commanding the boarding party of seamen, marines, engineers, and firemen that were to constitute the proposed prize crew. The request was granted, but just before he shoved off for the *Trent*, Captain Wilkes handed him a set of instructions that permitted no leeway for action or misinterpretation: "Should Mr. Mason, Mr. Slidell, Mr. Eustis, and Mr. McFarland[30] be on board, you will take them as prisoners and send them on board this ship immediately and take possession of her as a prize."[31]

Lieutenant Fairfax, nevertheless, had no intention of making a prize of the *Trent*. With studied, calm politeness, and a downright deference to Captain Moir, who he feared might out of indignation throw the ship on his hands and thereby defeat his intentions, he went about the task of getting the commissioners and their secretaries without seizing the vessel. This he did, though an over-zealous subordinate, because of a commotion among the rabidly pro-Southern passengers and crew, did order marines aboard and by an offensive show of strength all but defeated Mr. Fairfax's plan.[32] He also had to use technical force, consisting of three officers laying their hands first on one Confederate and then on the other, to get the commissioners into the cutter.[33] Though Fairfax's playing fast and loose with his superior's orders may not stimulate one's admiration for him, it must be admitted that his capture of the commissioners with so little friction was no mean task, especially when it is considered that it was done to a constant chorus of: "Did you ever hear of such an outrage?" "Marines aboard!" "These Yankees will have to pay . . . . ."; "England will open the blockade"; and " . . . . such a piratical act." And the most offensive spectator was the mail agent, clad in the uniform of a commander in the Royal Navy. The commissioners, however, were

[27] *Ibid.*, 130.
[28] Fairfax, D. McN., *op. cit.*, 136.
[29] Wilkes to Welles, Nov. 15, Official Records, Series I, I, 129 ff.
[30] Messrs. Eustis and McFarland were secretaries.
[31] Wilkes to Fairfax, Nov. 8, Official Records, Series I, I, 131-2; also Fairfax, D. McN., *op. cit.*, 136.
[32] Fairfax, D. McN., *op. cit.*, 137, 142.
[33] Fairfax to Wilkes, Nov. 12, Official Records, Series I, I, 133-4.

probably more than willing to be captured.[34]

Now that Lieutenant Fairfax had been aboard the *Trent* and transferred the Confederates to the *San Jacinto* without undue bluster, the next step was to get Captain Wilkes to stop with that. For his hand in the game, the Goddess of Luck had dealt him an ace in the hole. He truthfully described the crowded and hostile conditions aboard the contemplated prize; reported that the English crew would probably refuse to aid in sailing the ship to Key West, all of which would require a large prize crew. This, he pointed out, would leave the *San Jacinto* with but little more than a skeleton crew for the possible action before Port Royal. The captain was convinced, and the *Trent* was permitted to go her way.[35]

The North, depressed by the first Bull Run and afflicted with a growing hatred toward England because of the critical British press and open sympathy for the South, received the news with unrestrained and undisguised joy. Newspapers proclaimed Captain Wilkes to be the man of the hour.[36] Secretary Welles congratulated him, though he splashed a little cold water on the warmth thereof by remarking that the release of the *Trent* without being carried into an admiralty court "must not be permitted to constitute a precedent."[37] On the first day of the session of Congress, December 2, Wilkes was unanimously voted a medal for "his adroit and patriotic conduct."[38] By the time the *San Jacinto* had proceeded from Norfolk to Boston, by way of New York, to commit the prisoners to Fort Warren, the outpouring of superlatives had reached its greatest volume. The city of Boston gave Wilkes and his officers a banquet at the Revere House, where men, prominent in semiofficial and official circles, vied with one another in lauding the sea captain and in making undiplomatic remarks. Governor Andrew, of Massachusetts, for example, doubted if there was anything left to "crown the exultation of the American heart" now that Captain Wilkes had "fired his shot across the bows of the ship that bore the British Lion at its head."[39] The city government then voted the popular idol a sword, which, including expenses of presentation, cost $1,200.[40]

True enough, a few men in the high places of the government looked askance upon this high-handed stopping of a neutral ship, en route between neutral ports, and the removing therefrom men of a quasi-diplomatic status, and felt that even if England did not choose to make a fuss over it, she certainly had the right to do so. Secretary of State Seward apparently did not think it could lead to a serious complaint, but confided to his diary that "Captain Wilkes, having acted without any instructions from the government, the subject is therefore free from embarrassment which might have resulted if the act had been specially directed by us."[41] Obviously he intended to repudiate Wilkes if England should vigorously protest. Postmaster General Blair, in a cabinet meeting, denounced Wilkes's act as "unauthorized, irregular, and illegal" and suggested that the popular captain be ordered to carry Messrs. Mason and Slidell to Europe in the *San Jacinto* and hand them over to the English government. General McClellan is credited with having held the same opinion, and the usually impulsive Senator Sumner, of the foreign affairs committee, is said to have kept his poise (for once) on the subject.[42] But these few were

[34] Greer, Lieutenant James A. (one of the boarding officers), to Wilkes, Nov. 12, *Ibid.*, 135. Lieutenant Fairfax was personally acquainted with Mr. and Mrs. Mason, and Captain Wilkes knew the Slidell family. When Mrs. Slidell asked Mr. Fairfax who commanded the *San Jacinto*, he replied: "Your old acquaintance, Captain Wilkes." After a comment upon the effect the affair would have in Europe, she continued: "Really . . . . Captain Wilkes is playing into our hands!" At this point Mr. Mason stopped her with the remark that "it would be just as well not to discuss these matters at this time."—Fairfax, D. McN., *op. cit.*, 138-9. Captain Wilkes extended to the women of the party the hospitality of his ship should they desire to accompany their husbands, but the invitation was refused.—Wilkes to Welles, Nov. 15, Official Records, Series I, I, 131.

[35] Fairfax, D. McN., *op. cit.*, 140; Wilkes to Welles, Nov. 16, Official Records, Series I, I, 144.

[36] Adams, Charles Francis, "The *Trent* Affair," *American Historical Review*, XVII, 540-6.

[37] Welles to Wilkes, Nov. 30, Official Records, Series I, I, 148.

[38] Adams, C. F., *op. cit.*, 548.

[39] *Ibid.* (Quoting Boston *Evening Transcript* of November 27, 1861), 547.

[40] Adams, Charles Francis, "The Wilkes Sword," *Massachusetts Historical Society Proceedings*, XLV (1912), 590.

[41] Seward, W. H. (Baker, Geo. E., editor), *Diplomatic History of the War for the Union* (Boston, 1884), 46.

[42] Adams, C. F., "The *Trent* Affair," *American Historical Review*, XVII, 555.

unheard, unquoted, and ignored in the great wave of effervescent enthusiasm then sweeping over the press, orators, and masses.

In the absence of transoceanic cables, the North Atlantic packets carried to England the news of American jubilance about the same time the West India packet from St. Thomas brought information that the violation of the English flag had taken place. Their almost simultaneous arrival was too much for the English public, especially that part represented by the Tory party, which at once began leading the country along the path of war. Naval preparations were made; troops were ordered to Canada; Lord Russell wrote his testy ultimatum,[43] the offensiveness of which was partially toned down at the request of the Prince Consort; and Seward sought a graceful manner in which to back water. The crusty English demands for the deliverance of the commissioners did not stoop so much as to argue the matter in international law, hence Seward was left to build up his own line of logic as to why he ought to return the Confederates. To disavow completely Captain Wilkes's act was now out of the question for two obvious reasons: American public opinion would not stand for it; and the captain had been officially congratulated by the Secretary of Navy and Congress, not to mention the semiofficial ovations.

In a document that is more clever than consistent, Mr. Seward explained to Lord Russell why he was disposed to liberate the prisoners.[44] He supported Captain Wilkes's actions as being in full harmony with American rights in the case until he took up the lack of judicial procedure prior to committing the agents to prison. This he credited not to Wilkes and his officers, but to the shortcomings of international law in that "the books of law are dumb"[45] as to the proper procedure. "Only courts of admiralty have jurisdiction in maritime cases and these courts have formulas to try only claims to contraband chattels, but none to try claims concerning contraband persons. The courts can entertain no proceedings and render no judgment in favor of or against the alleged contraband men."[46] In view of this failure of maritime law to provide for the rendition of justice in such cases and the traditional policy of the United States on the rights of neutrals on the high seas, the commissioners would be cheerfully liberated at the time and place the British minister might direct.[47]

Though the Confederates were released, January 1, 1862, three weeks later Lord Russell felt called upon to refute America's "rights" in the case as set forth by Mr. Seward. This he did in a rather able manner.[48]

To indulge in an academic evaluation of the merits and demerits of the English and American positions in the *Trent* affair would not only contribute little or nothing to the further career of our subject, Charles Wilkes, but would also require much space and unnecessarily add to an already voluminous literature on that subject.[49] We might pause, however, to see wherein, and if, Captain Wilkes deserves the not always benevolent criticism to which American historians have subjected him.

The best document that can be presented in defense of Captain Wilkes was written by none other than Lord Palmerston. It is a letter to the editor of the London *Times* just three days after the seizure of the commissioners but about ten days prior to the arrival of the news in England.

It will be recalled that after the departure of the Confederates from Charleston on the *Theodora*, the *Nashville*, which was to have carried them to Europe, slipped through the blockade, and the U.S.S. *James Adger* was sent to the English Channel to intercept her, as Flag Officer Dupont thought she still had the commissioners aboard. By November

[43] *Ibid.*, 556.
[44] Seward, W. H., *op. cit.*, 295-309.
[45] *Ibid.*, 301.
[46] *Ibid.*, 302.
[47] *Ibid.*, 308-9.
[48] Russell to Lyons, Jan. 23, Official Records, Series I, I, 197 ff.
[49] Students of this episode generally concur in the opinion, some for one reason and some another, that United States was in error. And none can deny that if America was not in legal fault, she was, at best, grossly inconsistent. For excellent analyses of the situation of each country see: Adams, C. F., "The *Trent* Affair," already fully cited, which appears also in an expanded form with a wealth of supporting documents in the *Massachusetts Historical Society Proceedings*, XLV (1912); Moore, John Bassett, *A Digest of International Law* (Washington, 1906), VII, 768-79; Harris, T. L., *"The Trent Affair,"* Indianapolis, 1896; Villiers, Brougham, and Chesson, *Anglo-American Relations*, 1861-65, London, 1919; and Newton, T. L. W., *Life of Lord Lyons* (2 vols. London, 1913), chap. on the *Trent* affair.

6, the *Adger* was in English waters, where her commander learned from an English newspaper the true whereabouts of the diplomatic agents, then in Havana. He may have toyed with the idea of lingering in the Channel, intercepting the West India packet from St. Thomas, and doing exactly what Wilkes did November 8, though his correspondence with the Navy Department portrays intentions quite to the contrary, i.e., returning to Hampton Roads as soon as he had refitted and made sure that the *Nashville* had eluded him.[50].

Palmerston, nevertheless, gained the impression from some source that the *Adger* was going to stop the West India packet, and called a conference of the law officers of the Crown to ascertain British rights in such an event. The result was the letter to J. T. Delane, of the *Times*:

94, Piccadilly, November 11, 1861.

MY DEAR DELANE:

It may be useful to you to know that the Chancellor, Dr. Lushington, the three Law Officers, Sir G. Grey, the Duke of Somerset, and myself, met at the Treasury today to consider what we could properly do about the American cruiser, come, no doubt, to search the West Indian packet supposed to be bringing hither the two Southern envoys; and, much to my regret, it appeared that, according to the principles of international law laid down in our courts by Lord Stowell, and practiced and enforced by us, a belligerent has a right to stop and search any neutral not being a ship of war, and being found on the high seas and being suspected of carrying enemy's despatches; and that consequently this American cruiser might, by our own principles of international law, stop the West Indian packet, search her, and if the Southern men and their despatches and credentials were found on board, either take them out, or seize the packet and carry her back to New York for trial. Such being the opinion of our men learned in the law, we have determined to do no more than order the *Phaeton* frigate to drop down to Yarmouth Roads and watch the proceedings of the American within our three-mile limit of territorial jurisdiction, and to prevent her from exercising within that limit those rights which we cannot dispute as belonging to her beyond that limit.

In the meanwhile the American captain, having got very drunk this morning at Southampton with some excellent brandy, and finding it blowing heavily at sea, has come to an anchor for the night within Calshot Castle, at the entrance of the Southampton River.

I mention these things for your private information. Yours sincerely,

PALMERSTON[51]

[50] Marchand to Welles, Nov. 6, Official Records, Series I, I, 129.

[51] Adams, C. F., "The *Trent* Affair," *American Historical Review*, XVII, 552.

Apparently Lord Palmerston expected the influential *Times* to help the ministry weather adverse pubic opinion that he expected would follow such a violation of the English flag as Wilkes had already committed. In view, however, of the tremendous howl of vindicative protest that went up from the English public when the news of Captain Wilkes's deed, and the manner in which United States had greeted it, reached England, there is little wonder that the English ministry felt that it could preserve its existence better by sending the already greatly embarrassed United States an ultimatum than by shaping public opinion to accord with English precedents on the rights of belligerents.

Some writers have been disposed to base their criticisms of Captain Wilkes upon his failure to carry the *Trent* into port for adjudication by an American admiralty court. Such an objection is a result of having taken too seriously Secretary Seward's analysis of the situation when he was searching for legal technicalities that would justify him in surrendering the prisoners. Had Captain Wilkes refused to listen to the cajolery of his unenthusiastic subordinate, Lieutenant Fairfax, and forced him to seize the *Trent*, as it was intended that he should, indignation would have been even higher in England than it was; Secretary Seward would have had one less excuse to present, and the United States would have had the additional humiliation of releasing the *Trent*, regardless of the verdict of the prize court. We may dismiss this point by saying that it was well that Captain Wilkes lapsed from his customary rôle of martinet par excellence by failing to hold his lieutenant to the letter of his boarding instructions.

The real criticism of Captain Wilkes rests upon his failure to study the American admiralty decisions and more thoroughly American policy on the rights of neutrals, which had been set forth by American secretaries of state, as closely as he did the opinions of the English admiralty judges. He ignored one of the cardinal differences between international and municipal law, i.e., that in the enforcement of the former in time of war, each nation acts not only as its own policeman but also as its own judge and jury. Obviously he should have sought legal sanction for his plan of action, not in English policy and decisions, but in

those of America. Certainly, he should have committed no deed, the upholding of which would necessitate a reversal of America's known policy, without specific orders to do so, which, of course, he did not have.

In connection with his looking into the legality of his proposed act before its commission, one cannot but wonder why he refused to consult Judge Marvin while at Key West. It cannot be said that he was in duty bound to seek judicial advice, or that as a naval officer it was obligatory upon him to abide by any opinions the judge might have offered; but, to say the least, his avoidance of authoritative advice as to whether or not he should commit the very kind of act that, when committed by England, the United States had made the nominal cause of the War of 1812, is by no means commendable.

In dealing with his shortcomings in the legal aspects of the *Trent* affair, posterity can afford to be charitable. They were mistakes that many zealous naval officers might have made. Furthermore, a man mentally trained in the exact laws of physical science, as was Captain Wilkes, would naturally seek the same exactitude in maritime law. As England had exerted more influence in that field than any other power, together with the fact that it was an English ship he was about to intercept, he probably felt justified in attaching primary importance to the policies and court decisions of that nation. Taking it all in all, we can overlook his interpretation of international law with more generosity than we can the dilatory manner in which he made "the best of his way" from the African coast to Philadelphia.

It is a pity that biographical studies cannot be fairly written and at the same time abide by the technique of the short story. If it were so, we could now leave the subject of this sketch enjoying (thoroughly) the hatred of the English and the high esteem of his compatriots. To do so, however, would leave a task incomplete. While it is true that all the events of his life for which he is known to this generation have been covered, Captain Wilkes's active career by no means ended with the seizure of the commissioners. Before Secretary Welles could get him safely on the retired list, the doughty old sea dog was to precipitate another situation in which American and English naval crews stood at battle stations for thirty minutes and eyed one another over the breeches of loaded and shotted 8-inch rifles—a half-hour that was unquestionably pregnant with possibilities. For the brief period that it lasted, it was probably a greater threat to Anglo-American peace than the *Trent* affair, yet, for some reason the episode has been entirely overlooked by historians of the Civil War.

Although Secretary Welles permitted himself to be drawn into the public laudations that marked the arrival of Captain Wilkes with the Confederate commissioners, Messrs. Mason and Slidell, aboard the *San Jacinto,* to the extent of writing a short, official note of congratulations for the "great public service,"[52] the testy Secretary of the Federal Navy soon acquired a distrust for the over-zealous officer. So strong did this distrust become that it was with extreme deliberation that he went about assigning Captain Wilkes to a command suitable to his rank and length of service. (The expansion of the Navy had gone forward at such a rate that men on the old list of captains were blossoming out as flag officers.) Mr. Welles's hand was practically forced by a suggestion from President Lincoln that Captain Wilkes be given command of the James River flotilla, a division of Flag Officer Goldsborough's command which was then coöperating with General McClellan's army in the famous Peninsula Campaign of 1862.

The crabbedly conscientious Mr. Welles, always loyal to Lincoln and ever rightfully hostile toward fellow cabinet officers who tampered with his precious Navy Department, attributed the suggestion to "Seward's intrigue. It was almost a necessity that something be done for Wilkes. His act in taking Mason and Slidell from the *Trent* had given him éclat—it was popular with the country, was considered right by the people, even if rash and irregular; but when and where to dispose of Wilkes was an embarrassment to me, until the command of the James River flotilla was suggested."[53] Captain Wilkes, however, refused to take the command unless he were made independent of Flag Officer Goldsborough. Mr. Welles complied with this demand although

[52] Welles to Wilkes, Nov. 30, Official Records, Series I, I, 148.

[53] *Diary of Gideon Welles,* I, 73 (Aug. 10, 1862).

it angered Goldsborough almost to the point of resigning his command.[54]

At the time of Captain Wilkes's assignment to this new post, the Peninsula Campaign was already on the decline. The *Monitor* and the *Virginia (Merrimac)* had staged their famous set-to; McClellan had deliberately fought his way up to the outskirts of Richmond, thereby forcing the Confederates to evacuate Norfolk, burn the *Virginia,* and leave the James River open to Drury's Bluff, six miles from the Confederacy's capital, past which Goldsborough had been unable to blast his way with the *Monitor* and *Galena.* The Confederates, in turn, had made their terrific seven-day counter-attack (June 26-July 1), which had left McClellan with his dispirited army behind breastworks about Harrison's Landing. But the Johnnies were also exhausted and somewhat dispirited by their decisive repulse at Malvern Hill. Thus conditions along the James approximated a perfect stalemate when Wilkes arrived, July 10, to take over the twenty-three ships, ranging from the *Monitor* down to a few small river craft, all of which had been detached for him from Flag Officer Goldsborough's North Atlantic Squadron.[55] Six days later, Captain Wilkes was promoted to commodore.

With this force his primary duties were to keep the James open and to protect the transports and supply ships that were serving the army based on Harrison's Landing.[56] In view of this prosaic assignment and the military stalemate, nothing spectacular is either expected or found in this early stage of the new commodore's career.

While in this billet, however, he did not conduct himself in such a manner as to allay Secretary Welles's fears as to his competency for high command. On the very first day of his arrival in Virginia waters he began to complain to the department because of the deficiencies of his fleet. It was numerically insufficient, poorly equipped, short of officers, and short of men.[57] The department tried to comply with his demands by increasing his force to some extent[58] and gave him permission to carry out his own suggestion that he try to enlist a hundred men from McClellan's army for naval service, but warned him that in the past similar experiments had not proved satisfactory. It was the same in this case. The military officers evidently considered it an opportunity to purge their commands of undesirables, for when ten men obtained from that source came aboard the flagship, *Wachusett,* Commodore Wilkes sent them back with a curt statement that they were "not even food for gunpowder." This naturally drew a tart reply from General McClellan in defense of "these ten who have served with credit through the battles of the peninsula."[59]

Wilkes proved to be rather active and successful in gaining intelligence concerning Confederate ironclad building activities above Drury's Bluff and frequently expressed a desire to take the offensive. He worked out some sort of a plan in which he needed iron scout canoes for reconnaissance and planting mines or torpedoes. The department sent him some especially built to satisfy his wants. They must have been atrocities, for he vented his disappointment in a 250-word telegram. He could not use such "large, heavy old seal boats propelled by oars. I wanted light canoes, propelled by paddles. . . . . If it had been the intention to vitiate all my plans for their use, no more effectual mode could have been used than to have sent me such outlandish concerns."[60] August 21, eight days before the dissolution of the James River flotilla, found Commodore Wilkes still berating the department for interfering with his plans by withdrawing one or two of his ships and failing to comply with his desires.[61]

Apparently none of this prejudiced Secretary Welles against the commodore. But when Wilkes began to display a recrudescence of his old inclination to take departmental orders lightly, the secretary seems to have taken it as a personal challenge. It was a minor incident, but significant.

Under date of July 9, 1862, the department issued an order suspending two officers of Wilkes's command for the omission of some paper work and putting to sea without a signal book. In due time the orders in duplicate reached Commodore Wilkes with instructions for him to serve them at once

[54] *Ibid.*
[55] Official Records, Series I, VII, 552, 563.
[56] *Ibid.*, 548.
[57] Wilkes to Welles, July 10, 1862, *Ibid.*, 562.
[58] Welles to Wilkes, July 19, *Ibid.*, 581.
[59] McClellan to Wilkes, Aug. 1, *Ibid.*, 611.
[60] Wilkes to Welles, Aug. 1, *Ibid.*, 610-11.
[61] Wilkes to Welles, Aug. 21, *Ibid.*, 586.

on the officers concerned. Instead of doing so, he procured explanations from them for their neglect, which he forwarded to the department. He explained his failure to carry out the letter of his instructions by writing that he could not "suspend these officers from duty without injury to the service; and I beg leave to state that the suspension of officers produces a demoralizing effect upon this service, by drawing the attention of all from their legitimate duties, on which I wish their whole minds and time to be concentrated."[62]

Secretary Welles disapproved his action and reprimanded him for suppressing the orders of the department. In reply Wilkes penned four closely written pages justifying his action, which, instead of moving Welles from his position, drew a touch of sarcasm from the secretary relative to the commodore's labored explanation. This officially closed the matter for the time being, but in the meantime Mr. Welles had confided to his diary that Commodore Wilkes "is very exacting toward others, but is not himself as obedient as he should be. Interposes his own authority to interrupt the execution of the orders of the department."[63] And eight days later he again unburdened himself: "He (Wilkes) is a troublesome officer in many respects. Unpopular in the Navy and never on good terms with the department. Yet I have thus far got along with him very well, though in constant apprehension. . . . . He is ambitious, self-conceited, and self-willed."[64]

By August 29, activities had become so quiet on the Peninsula (both belligerents were concentrating for second Bull Run and subsequent Antietam along the upper stretches of the Potomac) that the James River flotilla as an independent command was discontinued. Five third-class cruisers, including the *Wachusett* (flag), *Tioga,* and *Sonoma,* with six mortar boats, were transferred to the Potomac flotilla, of which Wilkes became commander. The remainder of the pretentious fleet was returned to Goldsborough.[65]

Nothing of importance occurred during the brief period of nine days that Wilkes commanded on the Potomac. In the meantime, the activities in the West Indies of the C.S.S. *Florida,* first of the English-built Confederate cruisers, and the predatory progress of the C.S.S. *Alabama* westward from the Azores led Secretary Welles to an effort to checkmate these two commerce destroyers.

Orders were issued September 8, creating the West India squadron, to consist of seven third-class cruisers. The weight, metal, and speed of any one were roughly equivalent to those of either the *Florida* or the *Alabama.* Acting Rear Admiral Wilkes was assigned to the command of this squadron, with instructions to protect commerce and to capture the *Oreto (Florida)* and the *290 (Alabama).* Of secondary importance was the suppression of contraband trade. He was to proceed at once with the available part of the fleet; and was cautioned to "let no provocation induce you to invade the maritime jurisdiction of any neutral power, and let all your acts be within the recognized limitations of international law and regulations." In addition to this he was provided with a set of general instructions on such matters that had been prepared for all independent commanders.[66] In these instructions, prepared August 18 of that year, it was prohibited that American men-of-war should so much as exercise the right of search on "steam packets engaged in regular and stated mail service of foreign governments."[67] Rear Admiral Wilkes's zone was to be the waters of the Bahamas and the West Indies, though as a sort of second thought, he was to look in at Bermuda en route south.[68]

Of the seven ships assigned to him, only three were component parts of the Potomac River flotilla. The other four were to be detached from various commands and join him in the West Indies. Because of the usual delays incident to repairs, provisioning, and overhauling, two weeks or more elapsed before the nucleus of the West India squadron, consisting of the steam sloop *Wachusett,* nine guns, and the side-wheelers *Sonoma,* seven guns, and *Tioga,* eight guns, stood out to sea from the Virginia capes.

[62] Wilkes to Welles, July 31 "Commodore Wilkes's Court-Martial, House Executive Documents," 38th Cong., 1st Sess., Doc. 102, XV, 228.
[63] Entry of Aug. 10, 1862, I, 73.
[64] Entry of Aug. 18, I, 87.
[65] Welles to Wilkes, Aug. 29. Official Records, Series I, VII, 687-8.
[66] Welles to Wilkes, Sept. 8, Official Records, Series I, I, 470-1.
[67] Departmental instructions, *Ibid.,* 478.
[68] Welles to Wilkes, Sept. 8, *Ibid.,* 470-1.

In the afternoon of September 27, the three vessels arrived off St. George's, Bermuda. The *Sonoma* was ordered to cruise off and on while the *Tioga* and *Wachusett* went in for coal, supplies, and minor repairs.

Immediately Admiral Wilkes got into a row with Colonel Ord, the British governor. No English ensign was shown when the American warships entered the harbor. Furthermore, the representative of the governor who came aboard the *Wachusett* was "a person in ordinary dress, and no official characteristic about him."[69] Wilkes considered this last point so grave that he was tempted to refuse dispatches tendered him by this informal agent.[70] The admiral's ire was aroused still more by the presence of seven English steamers, obviously blockade runners, the captains of which even boasted on shore "that they were engaged in illicit or contraband trade with the rebels."[71] Concerning the non-display of the English ensign, Wilkes protested and received the regrets of Lieutenant Colonel Munro, who attributed it to the negligence of the guard detail and assured the admiral that proper disciplinary measures had been taken. The flag was then displayed and national salutes followed.[72]

All went well for the next few days, during which the *Tioga* and *Wachusett* coaled, provisioned, and underwent minor repairs. (The boilers of the flagship were troublesome during the entire time she was a part of the squadron.) A brig was chartered, nominally to carry a surplus of coal to a base near Carysfort light, Florida, that was being established by the department at Wilkes's request, but in reality to linger near Little Stirrup Cay, in the Bahamas, to offer a coaling point without taking cruisers on that beat away from the junction of the Providence channels.

The morning of the fourth day in St. George's Harbor, the *Tioga* and *Wachusett* got under way, but a boiler tube of the latter blew, and only the former stood out, while Admiral Wilkes asked Colonel Ord for a twelve-hour extension for his flagship.[73] Once clear of the harbor, the *Tioga* began cruising off and on, and the *Sonoma* came in for coal and provisions. During this time not one of the blockade runners had dared to leave the port. Even the cover of darkness was of no avail, for after nightfall the *Sonoma* would anchor in Five Fathom Hole, almost dead in the narrow entrance of the harbor, whence she might follow an escaping vessel outside the three-mile zone and effect her capture.

This policy of anchoring in Five Fathom Hole irked the English authorities. The night before the *Tioga* relieved the *Sonoma*, the latter had been boarded by Lieutenant Grant, of H.B.M.S. *Desperate*, who told Commander Stevens that it was the "governor's orders and the admiral's (Wilkes's) wishes" that the *Sonoma* be brought into port at once. This Commander Stevens naturally refused to do in the light of such an irregular manner of transmitting "orders." He was then told that if he did not come in at once, he would not be permitted to do so later. Stevens continued to demur, but after the blustery departure of the Royal Navy lieutenant, he called away his gig and went in to report the proceeding to Wilkes.[74] As we have seen, the *Sonoma* did not come in until the *Tioga* steamed out the following day.

It was now the governor's move. It came in the form of a comparatively polite protest against the anchoring of the *Sonoma* "in the fairway"; the immediate presence of the *Tioga* offshore, which, having filled her bunkers and storerooms at Bermuda, was not eligible, according to Her Majesty's neutrality rules, to remain in or return to those waters for three months; and that the *Sonoma*, having arrived in those waters with coal, but having expended much of it in cruising off that port, ought not to be permitted to replenish it, as that was in violation of "the spirit" of those same rules. In fact, his impression was that the *Sonoma* was to come in for *repairs* not to exceed thirty-six hours, and that no agreement had been made whereby she was to coal. He was, however, disposed to permit her to continue, as she had already started taking coal aboard.[75]

Admiral Wilkes's thousand-word reply would not be hailed by a symposium of diplomats as a model document. But Wilkes was not a diplomat and made no preten-

[69] Wilkes to Welles, Sept. 29, *Ibid.*, 485.
[70] Wilkes to Welles, Oct. 12, *Ibid.*, 563.
[71] Wilkes to Ord, Oct. 1, *Ibid.*, 497.
[72] *Ibid.*, 496.
[73] *Ibid.*, 495.
[74] Stevens to Wilkes, Oct. 1, *Ibid.*, 489.
[75] Ord to Wilkes, Oct. 1, *Ibid.*, 496.

tions thereto; hence his reply was in perfect harmony with what one would expect from a sea dog of his salty disposition. He recapitulated the veiled insults and irregularities that had attended his arrival in port and the presence of the blockade runners. "Notwithstanding the unfavorable impression this state of things was calculated to make upon my mind, I immediately tendered a national salute, which was, after some delay, accepted and returned gun for gun." As to Lieutenant Grant's strange mission to the *Sonoma* and the anchoring of that ship in the "fairway," "I must confess ignorance of what is meant by the term 'fairway' in an open roadstead." Furthermore, he had never "expressed any wishes to anyone relative to the movements of the *Sonoma*, and certainly would not do so to any officer of the British Crown, or through them, for the guidance of any commander under me. In your dispatch of today . . . . you state that no allusion was made to that vessel requiring coal. Captain Wyman (of the *Wachusett*) and myself are fully impressed with the fact that it was stated, and, even if it had not been pointedly referred to, your own knowledge and good sense would have led you to the conclusion that it was intended." Wilkes scotched this point by enclosing a copy of a note to the American consul, written at the governor's request, in which the coaling of the *Sonoma* was mentioned. In continuance he wrote: "In carefully perusing your dispatch, I cannot avoid being struck with some of its peculiar expressions, one of them, 'I have to instruct you that this vessel (the *Tioga*) cannot be permitted to return within these waters.' This I cannot permit; my government has alone the power of instructing me." In closing he extended thanks to the authorities "in behalf of my government, for the limited privileges extended to us" and then roundly rebuked them because the privileges had not been unlimited.[76]

The following day the *Wachusett* and *Sonoma* left the harbor. The former proceeded to Havana, and the latter joined the *Tioga* in the maintenance of a virtual blockade off St. George's. This they were to continue until just enough coal remained to carry them to New Providence Channel, where they would refuel near Little Stirrup Cay, and take up assigned patrol beats among the Bahamas.[77] Leaving two steamers off Bermuda while he went south to pick up the other units of his command was a justified measure, for the last reports on the *Alabama* indicated that she was still in the North Atlantic. In actuality she was then on the Grand Banks, and the Bermudas would be the first logical coaling point as she swung south. Wilkes mentions this only casually, but says in no uncertain terms that he left them off Bermuda because he was provoked at Governor Ord and the Bermudians, "a pack of Secessionists."[78]

If his intentions were truly to provoke them in turn, he certainly succeeded. October 5 the *Tioga* followed a light steamer around Catherine Point and maintained a vigilant guard on the west side of the island. The next day the English mail steamer *Merlin* was intercepted as she approached St. George's, but her papers were found to be correct. October 7, H.B.M.S. *Desperate* came out with a large lead-colored steamer following on her port quarter. The *Sonoma* disregarded the man-of-war and made the merchantman heave to when four miles out for the examination of her papers and bills of lading. This was done though the *Desperate* approached to within five hundred yards as if to oppose the boarding. In the meantime, the Bermudians had closed shops and declared a holiday in order to view the impending naval duel from the hilltops. All proved correct with the merchantman, but while the boarding party was busy, two other steamers put to sea, and were promptly chased back into port by the *Sonoma*. The *Desperate* withdrew without further demonstrations.[79] Obviously she and the innocent merchantman were deliberately creating a diversion to give the blockade runners a good lead. The next day, Commander Stevens sent in a boat to communicate with the consul. This caused a note of protest from Governor Ord.[80] Stevens, following in the footsteps of his admiral, notified the governor that the boat had landed to communicate with the consul "on matters pertaining to the interests of the government of the United States."[81] With

[76] Wilkes to Ord, Oct. 1, *Ibid.*, 496-8.

[77] Wilkes to Stevens, Oct. 2, *Ibid.*, 499.

[78] Wilkes to Welles, Oct. 12, *Ibid.*, 504.

[79] Stevens to Wilkes, Oct. 19, *Ibid.*, 511-2.

[80] *Ibid.*, 512.

[81] Stevens to Ord, Oct. 11, *Ibid.*, 502.

the bunkers nearly empty, the *Tioga* and *Sonoma* left for the Bahamas, October 12.

For the next few months Wilkes made Havana his headquarters. He was soon joined by the side-wheelers *Octorara* and *Santiago de Cuba,* mounting ten guns each. The remaining two ships, *Dacotah* and *Cimarron,* originally assigned to him, never joined. Various delays kept them and when they did become available, the department felt that they were more urgently needed elsewhere. In the winter and spring of 1863, however, his command was reënforced by the cruisers *Rhode Island, Juniata, Alabama* (U.S.S.), and the sailing ship *Shepherd Knapp,* with suitable auxiliary craft.

With the five steamers now at his disposal, Admiral Wilkes maintained patrols in the important channels of the Bahamas and along the north coast of Cuba. Coal was obtainable at Turtle Bay, Florida, Havana, and most of the time at Stirrup Cays. The flagship was given no regular beat other than to stay in the vicinity of Havana and take the admiral on general tours around his zone.

It was on one of these tours that he again had unpleasant and almost disastrous contacts with the English. November 20, he was off Nassau, English base for an enormous fleet of blockade runners. Two boats came out of that port, one from the governor, the other from H.B.M.S. *Barracouta,* bearing the usual courtesies from Captain Malcolm, R.N. The governor's boat was well in advance and brought the news that Wilkes could not "anchor at or off this port without the governor's permission," but the boat had a pilot aboard in case the admiral wished to go in. The executive officer, at the admiral's behest, told the governor's emissaries "that he should anchor if he saw fit to do so without reference to the governor's wishes or prohibitions." The *Wachusett* then stood off without permitting the man-of-war's boat, which was now close at hand, to come alongside.[82]

This created the wildest rumors in Nassau, the most outstanding of which, according to Consul Whiting, was that "Admiral Wilkes had sent word to the governor to ———." Captain Malcolm made an excited trip to the American consulate and recounted the whole episode but left somewhat soothed by the unperturbed Whiting.[83]

A few days later, Wilkes received news from the consul that Captain Malcolm had been quoted as saying that he would fire into the first American man-of-war that attempted to anchor in a prohibited location. November 24, the *Wachusett* was at Stirrup Cays and was getting under way to chase two vessels in the offing. Another "vessel was seen over the land which we recognized as the *Barracouta.* I (Wilkes) immediately steamed out toward her, and she bore down for us. We went immediately to quarters and prepared for action. She approached within one-fourth of a mile. I stopped and laid by for the result. We could distinguish the crew at quarters, and quietly awaited his further action. We laid thus side by side without (although within) hailing distance for twenty-five minutes, closely regarding each other, when, whatever might have been his intention, he steamed up, wore round, and stood off . . . and I gave orders to put the steamer's head in chase of two vessels seen in the offing. . . . . I have no idea what the captain of the *Barracouta's* intention was. . . . . I shall be over cautious to avoid being the first to break the peace . . . . but if anyone should take upon themselves to break it, or do insult to our flag, they must take the consequences. The *Barracouta* is a much heavier armed vessel than the *Wachusett,* but that is of little consequence."[84]

Admiral Wilkes ended most of his official dispatches by asking for more ships and bemoaning the mechanical condition of the fleet in general and the *Wachusett* in particular. Nor did he deviate from his usual custom in this letter, but he made an additional request for heavier guns to be mounted on those ships he did have, the only time he made such a request during his command of the squadron. Though the incident was then nine days old, he was still thinking of the heavier armament of the *Barracouta.* Not that he lacked the courage to face it, no indeed! He wanted the heavier guns to intimidate the English men-of-war into non-interference, and that the Americans might better acquit themselves in case of an armed clash, which he obviously felt was near at hand. It is also significant

[82] Whiting (consul at Nassau) to Wilkes, Nov. 23, *Ibid.,* 555. Wilkes reported essentially the same details to Welles, Dec. 4, *Ibid.,* 571.

[83] *Ibid.,* 556.

[84] Wilkes to Welles, Dec. 4, *Ibid.,* 572.

that the English West India squadron was reënforced immediately after this episode.[85]

Welles's letter of December 25 was probably in reply to the dispatch from Wilkes that is quoted above. It is worthy of characterization here in that it shows the secretary's typical attitude toward Wilkes during this period. As usual he explained that there were no more ships available as the efficiency of the blockade must not be impaired. Wilkes was reminded that his primary duty was to capture the Confederate commerce destroyers and that the contraband trade was secondary. "Thus far no important results have attended your presence in the vicinity of Nassau. It has probably made the illicit traders more cautious and exasperated the authorities, but has effected no captures. . . . . It will be well, I think, that you avoid as far as possible visiting the English ports during the excited condition of the colonial authorities."[86]

This advice was written a little too late for practical application, for Admiral Wilkes, though he left three of his ships north of Cuba and among the Bahamas, had already shifted the cruising activities of the *Wachusett* and *Sonoma* to Cape San Antonio, Cienfuegos, and the Caymans. This was a result of the reports of depredations by the *Alabama* in the Caribbean and her capture of the SS. *Ariel*, a "California steamer" from New York to Central America. Being outward bound she was a lean prize, and Wilkes reasoned that Captain Semmes would next lie in wait for one laden with bullion on a return voyage. Because of the war, the return route of these treasure steamers had been shifted so that it now lay west of Cuba instead of through Windward Passage. This widening of the patrolled area brought Wilkes directly across the path that Semmes would and did follow, but he did not have the good fortune to fall in with the raider.

The net result of this shift, though a good move, was the capture of a prize and friction with Mexico. The week between Christmas and New Year, Wilkes, with the two vessels indicated, was patrolling off Cape San Antonio. Officers and men were particularly alert, for they had been told at Grand Cayman a few days before, that the *Alabama's* tender, *Agrippina*, had left there three nights before in response to light signals from seaward. Feeling that the Confederate cruiser must be taking on coal in some obscure inlet, Wilkes decided to visit the Yucatan coast and the bordering islands of Mujeres and Cozumel. Approaching the coast, he gave chase to the schooner *Pepita*, which sought refuge at Mujeres. In the harbor he found the fine, fast steamer *Virginia*, which caused his pulse to miss a beat for she strongly resembled the *Alabama*. Her captain eagerly, if not joyfully, explained to Wilkes that she was a blockade runner and was awaiting there only for the contraband cargo which had just arrived on the *Pepita*. But alas, while he had waited, the Mexican port authorities had seized his ship because of her former record, under the Spanish flag and name of *Noe-Daquy*, as a notorious slaver. He was more than willing to be captured by the Americans and take his chances in their admiralty courts. Admiral Wilkes was equally willing to make the capture, hence he ordered a lieutenant and eighteen marines aboard, pending the clearance of the craft as a slaver.[87]

He then looked into the case, decided that the *Virginia* was a bona fide blockade runner and sent the *Sonoma*, to Progreso, whence Commander Stevens proceeded to Merida to obtain the Mexican governor's dismissal of the slaver charges. The governor was gone and would not be back for a fortnight. After a long delay, Wilkes became disgusted with the semi-revolutionary conditions at Mujeres and with the petty graft of those supposed to be in authority and ordered the captain of the *Virginia* to put to sea. Outside the three-mile limit, the capture was officially declared.[88] Of course this soon brought a violent protest, with accompanying embarrassment to the Navy Department, from the Mexican foreign office.[89]

While Wilkes was thus engaged, the *Alabama* was actually refitting at Arcas Cay, west of Yucatan. January 11, she engaged and sank the U.S.S. *Hatteras* (much inferior to the *Alabama*) off Galveston, Texas, and doubled in her tracks to pass once again between Cuba and Mexico and reach Kings-

[85] Whiting to Wilkes, Dec. 11, *Ibid.*, 582.
[86] Welles to Wilkes, Dec. 25, *Ibid.*, 588.
[87] Wilkes to Welles, Jan. 2, 1863, Official Records, Series, I. II, 5-6.
[88] Wilkes to Welles, Jan. 18, *Ibid.*, 43.
[89] Minister M. Romero to Seward, Feb. 23, *Ibid.*, 43.

ton, Jamaica, January 20. Captain Semmes remained there, unmolested, for five days. From there he proceeded to the Atlantic, down the Brazilian coast, then to the Cape of Good Hope, Indian Ocean, Sunda Straits, and the China Sea.[90]

For his long, unmolested stay at Jamaica, Captain Semmes, in all probability, owed thanks to Lady Luck, for the Federals had been given something else to worry about. The night of January 15, the *Florida*, which had been blockaded in Mobile since September 4, got through Farragut's squadron and fled southward with the *R.R. Cuyler* and *Oneida* in hot pursuit.[91] They lost the chase the first day, but continued southward. Arriving off Cape San Antonio, the *Cuyler* fell in with the *Santiago de Cuba*, of Wilkes's command. From a Mobile pilot, the Federals had heard that the *Florida* was carrying a double ship's company for the obvious purpose of manning a converted merchantman. Upon hearing this from Commander Emmons, of the *Cuyler*, Ridglely, of the *Santiago de Cuba*, told of the large, fine *Virginia*, supposedly still at Mujeres. Immediately both steamers started on a wild-goose chase to Yucatan, their commanders fully expecting to surprise the *Florida* in rendezvous with the ex-slaver. When they arrived they found that Admiral Wilkes had but recently settled her case in the manner shown. Filled with chagrin, they laid a course for Cuba. En route they encountered the *Wachusett*, and Admiral Wilkes sent both of them on a ten- or twelve-day cruise around Cuba, by way of the south shore, the Caymans, and Windward Passage.[92] Unfortunately, he did not include Jamaica in their itinerary, for there they would have caught the *Alabama*.

After making this assignment, Admiral Wilkes steamed posthaste to his base at Havana to recover control of his far-flung squadron. He arrived the evening of January 22, too late to enter the harbor without violating Spanish regulations. This was particularly unfortunate, for the *Florida* had reached there just twenty-four hours earlier, coaled during the night, and got to sea that morning at six. Wilkes did not learn of this until he entered port the next day at dawn. While he was taking on supplies for the pursuit, the *Oneida* appeared outside. Wilkes annexed her to his command, as he had the *Cuyler* a few days before, and ordered her to rendezvous with the remainder of his available squadron off Cardenas.[93]

While off Cardenas, Wilkes picked up and annexed the *San Jacinto* also. She was in those waters on an independent search for the Confederate raiders. With these additions and the regular ships of the squadron, the admiral doubled his patrols in the Bahamas, as he was thoroughly convinced that there would be the next appearance of the destroyer.[94] Once again he anticipated fairly well the actions of the enemy, for the *Florida* put in to Nassau, January 26, because of the defective coal taken on at Havana.[95] Exactly a week later, she was encountered by the *Sonoma*, on the Great Bahama Bank, well north of Lobos Cay. The result was one of the most spirited chases of the Civil War. Under a press of steam and sail, the *Florida* fled up the tongue of the ocean, and to the open Atlantic by way of Northeast Providence Strait. For three hundred nautical miles the *Sonoma* stayed on her stern, and when the breezes were light drew up almost to within gunshot three times. A fresh wind, however, gave the *Florida* the advantage, and she shook off the pursuer a hundred and twenty-five miles northeast of Hole in the Wall.[96]

Wilkes now apparently reasoned that since the *Florida*, having recently coaled in English and Spanish ports, could not refuel under those flags, according to the neutrality rules of those nations, until long after her existing supply would be exhausted, Maffit would next seek the hospitality of the French, Danish, or Dutch possessions. He depleted the Bahama patrols, and, retaining the *Cuyler*, *Oneida*, and *San Jacinto*, extended his cordon to St. Thomas and southward among the Lesser Antilles. Fuel and

[90] "Extracts from journal of Commander Semmes, C.S.N.," *Ibid.*, 720 ff.

[91] Soley, Jas. R., "The Confederate Cruisers," *Battles and Leaders of the Civil War*, IV, 595; Official Records, Series I, II, 669-73.

[92] Emmons to Farragut, Jan. 21, Official Records, Series I, II, 29; Emmons to Commodore Hitchcock, Mar. 12, *Ibid.*, 31.

[93] Consul General Shufeldt (later rear admiral, U.S.N.) to Seward, *Ibid.*, 47, 50-1.

[94] Wilkes to his various commanders, Jan. 23-6, *Ibid.*, 56-9.

[95] "Extracts from journal of J. N. Maffit" (captain of the *Florida*), *Ibid.*, 668.

[96] Stevens to Wilkes, Feb. 3, *Ibid.*, 68-9, "journal of J. N. Maffit," *Ibid.*, 669.

supply bases were established at Mole St. Nicholas and St. Thomas.[97]

The last week in February, the U.S.S. *Alabama* reached St. Thomas, where the *Wachusett* with Admiral Wilkes still aboard was temporarily based, for duty with the West India squadron. About the same time, the sturdy, fast *Vanderbilt*, a big side-wheeler of fifteen guns, put into St. Thomas. She was on an independent cruise in search of the *Alabama*. The orders of Lieutenant Baldwin read: "When you are perfectly satisfied that the *Alabama* has left the Gulf or the West Indies and gone to some other locality, you will proceed along the coast of Brazil to Fernando Noronho and Rio de Janeiro, making inquiries at such places as you think advisable. From Rio continue your course to the Cape of Good Hope."[98] Admiral Wilkes, nevertheless, added her to his fleet and transferred his flag to her.[99]

In extending his activities eastward, Wilkes once again anticipated the future appearance of his foe, but he erred in leaving English possessions out of his considerations as to possible refueling points for the *Florida*. While he was watching Danish and French islands, a trading schooner brought him news of the *Florida's* having coaled at Barbados. This was her last appearance in the West Indies, for she, as had the *Alabama*, shifted to the South Atlantic and the Brazilian coast. Although the bird had flown, Wilkes considered it worth while to go to Barbados, March 6, to rebuke the governor for having violated his own country's neutrality rules by permitting the *Florida* to coal so recently after having taken on fuel at Nassau. He got this diplomatic matter off his chest in his customary undiplomatic manner, and returned to his base at St. Thomas.[100]

In the meantime, Farragut had set up a hue and cry for the return of his ships, the *Cuyler* and *Oneida*, not only to Wilkes but to the department as well. His first letter was written as early as February 6, but it was over a month before the *Cuyler* was returned, and Farragut did not get the *Oneida* back until after Wilkes was relieved by Lardiner, June 20. This was in spite of a number of communications from the department ordering her return. All that Welles could get from Wilkes on that subject was that the *Oneida* would be returned "after she performs the present important service she is on."[101] It was seldom that Farragut could get an answer that was as reassuring as that. "Under these conditions [the breakdown of the *Wachusett*] I hope to retain the *Oneida*."[102] The important service to which Wilkes referred was patrolling in the vicinity of Martinique.

Baldwin, of the *Vanderbilt*, was also getting impatient. Toward the end of March, he took advantage of a brief period in Key West for coal, while the admiral had remained in Havana, to communicate with the department direct. "Until the admiral will permit, I cannot, of course, carry out the orders I am under from the department, but can only hope he will have no further service for this ship and will allow me to act in accordance with my instructions."[103] On his return to Havana, however, the admiral again hoisted his flag on the *Vanderbilt* and did not release her until June 12, though Lieutenant Baldwin repeatedly expressed himself as being of the opinion that the raiders had left the West Indies, and that he should be on his way down the Brazilian coast.[104]

Two reasons may be offered for Wilkes's tenacity in clinging to these additional ships. First, he had lost the *Wachusett*, *San Jacinto*, and *Sonoma* before the middle of May as a result of their being called in for repairs. Though he mentioned the loss of these ships repeatedly as a justification of his retention of the *Vanderbilt* and *Oneida*, it is not a tenable excuse. The *San Jacinto* had never been his to keep, and though he had lost the *Sonoma* and *Wachusett*, the department had given him the *Alabama*, *Rhode Island*, and *Juniata*, the last named

[97] Official Records, Series I, II, 90-5.

[98] "Report of the Secretary of Navy," 1863, House Executive Documents, 38th Cong., 1st Sess., Doc. 1, IV, pp. xxiii-xxiv.

[99] Wilkes to Welles, Feb. 25, Official Records, Series I, II, 97-8.

[100] Wilkes to Welles, March 7, and the former's correspondence with the governor of Barbados, *Ibid.*, 113-7.

[101] Wilkes to Welles, Apr. 2, *Ibid.*, 140.

[102] Wilkes to Farragut, Mar. 23, *Ibid.*, 135.

[103] Baldwin to Welles, Mar. 30, *Ibid.*, 138.

[104] Baldwin's testimony (unrefuted) Commodore Charles Wilkes's Court-Martial, House Executive Documents, 38th Cong., 1st Sess., Doc. 102, XV, 20 ff.

to be his flagship.[105] Instead of accepting her as such, he based her at Havana and gave her a cruising beat in that vicinity.

His second reason for holding the ships in the face of contrary orders rested upon his opinion that it was but a matter of a few weeks until the raiders would again invade his zone, and when they did, he naturally wanted to be prepared. In the meantime, his correspondence indicates, he felt that he was fully utilizing them by curtailing the activities of blockade runners in those waters. His assumption that the raiders would soon return was an honest mistake such as any naval officer might make. He is, nevertheless, still subject to censure on the score that he became so engrossed and so filled with the importance of his own mission that he seems (if his official correspondence is a fair indicator) to have lost sight of the needs and importance of the missions of other commanders, not to mention the large-scale objectives of the department. As for cramping the blockade runners while cruising for the raiders, he did unquestionably make them more cautious, but in doing so he seriously antagonized Mexico and Denmark,[106] and flirted dangerously, as we have seen, with the neutrality of England.

His actual captures, however, were comparatively insignificant. Thirty prizes were taken by his squadron during the ten months he was in command, but for the most part they were small sailing craft—sloops, schooners, and the like. Two of the steamers that he did capture, the *Peterhoff* and the *Springbok*, both of which were bound for neutral ports but laden with obvious contraband for the Confederacy, are of particular interest to students of international law in that their condemnation by American courts established an extension of the doctrine of the continuous voyage, i.e., the ultimate destination of contraband goods, and not that of the ship, made them subject to capture, though the ship, if then bound for a neutral port, should be released.[107] England accepted this principle and exploited it to the fullest extent against Germany and over American protests during the World War.[108]

Thoroughly dissatisfied with Wilkes, Secretary Welles decided as early as May 12 to relieve him, [109] though it was June 1 before the necessary orders were issued assigning Admiral Lardiner to the West India command.[110] Another twenty days elapsed before that officer, aboard the *Ticonderoga*, found Wilkes at St. Thomas and formally took over the squadron.

With this official act, Wilkes's rank reverted to commodore. He returned to Washington and was placed on the retired list, in accordance with the Retirement Act of December 21, 1861, as his age was in excess of sixty-two. This fact brought no consolation to the still ambitious captor of Mason and Slidell, for he knew full well that the department was not enforcing the act against all officers over that age. The retired commodore's cup of bitterness was filled to the overflowing when the annual report of the Secretary of Navy was published early in December, 1863.

In this report, Secretary Welles publicly blamed Wilkes for the continued depredations of the Confederate raiders:

> The department, anticipating that the *Alabama* and her associates would find it necessary to abandon the neighborhood of the Antilles, and satisfied of the direction they would then take, ordered the *Vanderbilt*, a fast steamer, on independent cruising duty, first to the West Indies, and then onward to the South. . . . .
>
> In derogation of these special and explicit orders [to Baldwin, of the *Vanderbilt*], Acting Rear Admiral Wilkes on falling in with the *Vanderbilt* transferred his flag to that vessel, and attaching her to his squadron, detained her in his possession so long as to defeat the object and

[105] For a time he also had the *Mercedita* and *Connecticut*, but he had little or no control over their movements as they were assigned by the department to convoy the California steamers.

[106] By the capture of the *Peterhoff*, wherein Wilkes, from the *Wachusett*, in St. Thomas Harbor, ordered the *Vanderbilt*, standing in, to follow the *Peterhoff* outside the three-mile limit and effect her capture, the Danish hospitality was slightly dampened. It reached the vanishing point when he transferred his flag to the *Vanderbilt* and left the *Wachusett* as a sort of guard ship to follow other English blockade runners to sea and intercept them. Indeed, H.B.M.S. *Phæton*, soon appeared in those waters and escorted at least one English blockade runner out of the harbor.—Official Records, Series I, II, 97-101, 125, 150-5.

[107] Moore, John Bassett, *Digest of International Law*, VII, 719 ff.

[108] Latané, John H., *A History of American Foreign Policy*, 583.

[109] Welles, Diary, entry of May 12, 1863, I, 299.

[110] Welles to Lardiner, June 1, Official Records, Series I, II, 251.

purpose of the department. He did not release her until the 13th of June when Commander Baldwin proceeded to carry out his instructions, but he was too late. He arrived at Fernando Noronho the 4th of July, at Pernambuco on the 6th and at Rio de Janeiro on the 14th, thence he proceeded on the second of August to St. Helena, instead of going direct to the Cape of Good Hope. The unfortunate detention of the *Vanderbilt* wholly defeated the plans of the department for the capture of the *Alabama, Florida,* and *Georgia.* They, as the department anticipated, arrived in those latitudes and visited those ports in May; but the *Vanderbilt,* instead of being there to receive them as the department intended, was improperly detained in the West Indies.[111]

It is extremely doubtful if Mr. Welles honestly and sincerely believed that the *Vanderbilt* would have destroyed the raiders had she not been detained. Admittedly she might have, but the possibilities were slim, for a raider on the high seas in 1863 was even more of a needle-in-the-haystack proposition than it is today. And the British Navy, with radio at its disposal, will testify that the German commerce destroyers showed where the odds lay in 1915, once a cruiser got to sea. Welles must have known when he wrote his report the difficulties involved. Wilkes's entire fleet in the West Indies had not had the good fortune to corner either the *Alabama* or the *Florida.* In June of that same year, Secretary Welles had rushed to sea no less than thirty-eight bottoms in search of the lone sailing raider *Tacony,* burning ships right and left between the Virginia capes and Cape Cod, without results.[112] About the same time that the *Vanderbilt* was sent out, the *Wyoming* was dispatched to the Sunda Straits on the same mission. She was not detained, and though the *Alabama* visited those narrow seas, after the arrival of the *Wyoming,* where the chances of interception were infinitely greater than in the open waters around Good Hope, the Confederate had no trouble in avoiding the Federal cruiser. Yes, it is indeed doubtful if Mr. Welles believed his own vigorous denunciation.

It is furthermore unlikely that it was launched against the hero of the *Trent* affair because of a personal animus, though there is ample evidence in Welles's diary that he had no love for the fractious old sea dog. Then why did he write it? In all probability because he needed a good scapegoat to carry the public odium of the raiders' successes. In passing it on to Wilkes it would serve the additional purpose of explaining to the critical public why the still popular and famous Wilkes was left on the beach while less-known commanders flew broad flags over extensive squadrons.

But Wilkes had no intentions of ending his naval career as a scapegoat. He not only repudiated the charges of the secretary in a rather sassy letter,[113] but also permitted that communication to get into the hands of Washington press correspondents even before it reached Mr. Welles, which was in direct violation of a then standing general order prohibiting the publication of all official communications.

It was now Mr. Welles's move in this unseemly verbal battle for public vindication. It came in the form of a court of inquiry and a resultant sensational court-martial, for Wilkes's recent record, omitting the writing and publication of the offensive letter, gave the department ample weapons for this counterattack.

Commodore Wilkes was called before the court the following spring and prosecuted on five charges supported by appropriate specifications. Needless to say, all the irregular spots in Wilkes's record since the *Trent* affair were dusted off. The first charge was for disobedience and was based upon the detention of the *Vanderbilt,* the annexation of the *Cuyler* and *Oneida,* and his refusal to return the last two when so ordered.[114] Second, "insubordinate conduct and negligence . . . . in obeying orders"[115] referred to his failure to suspend the two officers while he commanded on the James River, and to a trip he made from St. Thomas to La Guaira, Venezuela, to aid the State Department in the settlement of some American claims. The prosecution considered this latter act a deviation from the primary objective assigned to him in the West Indies. Third, disrespect and disrespectful language to a superior officer, which, of course, rested upon the letter Wilkes had written to Welles. Fourth, re-

[111] Report of the Secretary of Navy, 1863, House Executive Documents, 38th Cong., 1st Sess., Doc. 1, IV, pp. xxiii-xxiv.

[112] Official Records, Series I, II, 275-8, 286-90, 299, 303, 308, 312, and 314-6.

[113] Wilkes to Welles, Dec. 11, *Ibid.,* 567.

[114] Commodore Charles Wilkes's Court-Martial, House Executive Documents, 38th Cong. 1st Sess., Doc. 102, XV, 5-6.

[115] *Ibid.,* 8.

fusal of obedience to a lawful general order, based upon the publication of the letter in question. The fifth and last charge was for "conduct unbecoming an officer and constituting offense made punishable by article VIII . . . for the government of the Navy." It rested upon Wilkes's refusal, or failure, to answer official queries as to his exact age, and when he did answer, the information given was insufficient.[116]

The court found that all specifications were proved to be as stated and rendered a verdict of suspension for three years.[117] Before his restoration, the war had ended. Nevertheless he immediately became a rear admiral on the retired list,[118] and lived in comparatively quiet retirement until his death in 1877.

The best conclusion to this brief study is perhaps found in a remark made at the outset, i.e., Wilkes had *nearly* all the qualities of a great admiral. Admittedly he was sometimes rash and occasionally held in light regard the orders of his superiors, but more than one great commander has suffered from these same shortcomings only to have them proclaimed as virtues after he had attained success. Given a little luck in the West Indies, the same might have been said of Wilkes. Had he been fortunate enough to have destroyed the *Florida* or the *Alabama* he would have acquired at least the fame that later accrued to Winslow, of the *Kearsarge*, which, with his popularity growing out of the *Trent* affair, would have made Wilkes one of the outstanding naval figures of that fratricidal war. But here we are speaking in terms of good fortune, and there is a grave question as to whether Admiral Wilkes's conduct of operations in the West Indies merited for him any favors from the gods of chance.

[116] *Ibid.*, 9-10.
[117] *Ibid.*, 146-7.
[118] Hamersly, Lewis R., *op. cit.*, 25.

THE CHRISTMAS SHIP

By Admiral Hugh Rodman, U. S. Navy (Retired)

THE following item is from the New York *Times* of December 23, 1930:

Washington, December 22 *(AP)*—Hundreds of happy children shouting from the decks of Uncle Sam's warships will greet their seagoing Santa Claus as he climbs aboard with his bag on Christmas morning.

About 63,000 officers and men will spend Christmas this year aboard naval vessels. Far from home and their own children, the personnel of battleships and aircraft carriers have softened the homesick feeling by giving Christmas parties to the needy children of the port of anchor.

Naval officials today said the custom, inaugurated by Captain Hugh Rodman of the battleship *New York* in 1916, would be continued this year. It was estimated that more than 2,000 needy children would be entertained on Christmas day by the Navy afloat.

Nothing could give me greater pleasure and satisfaction than to feel that I am justly entitled to the credit of having established and perpetuated this custom, for such, I am sorry to say, is not the case; it belongs solely to the enlisted force of the *New York,* at Christmas time, 1915.

In 1917, when we entered the war, I was ordered to command our battleship force serving with the grand fleet; the *New York* was my flagship. After hostilities ceased, and I had returned to America, in discussing conditions and the very friendly and cordial relations which existed between the American and British naval forces, amongst other statements was the following:

My flagship, the *New York,* was known in the Navy as the "Christmas Ship," since it had originated the custom of going into the highways and byways at Christmas time, collecting the waifs and strays who otherwise would have had no Christmas, and bringing them on board, after the ship had been elaborately decorated and prepared for their reception. We entertained them with a dinner, children's games, and a Christmas tree where toys were distributed and where each boy received a scout outfit, and the girls a set of cheap furs. Here let it be said, though this was done under my command, the conception and execution of the idea was entirely in the hands of the enlisted personnel, who deserve the entire credit.

Not knowing that we would be ordered abroad, we had laid in our supplies on the supposition that we would be in an American port, but Christmas found us at Edinburgh, Scotland.

After discussing the situation, the men decided that a child was a child, whether American or Scotch. They asked 125 children to come on board, preferably those who had been orphaned during the war—the poorer and more dependent, the better. They were assembled and brought down to the ship, some seven or eight miles, in motor busses. Once aboard they were entertained, given a good dinner, and the usual toys and presents, and in addition each youngster was given two bright silver shillings—probably the greatest amount of cash any of them had ever possessed at any one time.

This statement is quoted in full and verbatim to reiterate and emphasize the fact, that I would be a hypocrite, and sailing under false colors, if I claimed or let others believe that I am entitled to the credit which belongs solely to the enlisted personnel of the *New York* serving on her at Christmas time, 1915.

My recollection is that the committee of the crew, headed by the chief master-at-arms, first made the suggestion, that it at once appealed to me, and officers and men alike wanted to subscribe and coöperate in making it a success. But it soon became apparent that since the men had originated the idea, and it promised to be a success, that they should receive the entire credit; and while the officers were more than willing to subscribe, none of us did, but freely gave our aid and assistance in promoting the enterprise.

The "Christmas Ship" idea spread at once to other ships in the Navy, and I sincerely hope it has become the custom with all ships, and will be continued as one of the Navy's most cherished traditions. It is interesting and advisable to record such events while fresh in one's memory, and it is with this spirit I have done so.

DRAFT CONVENTION OF 1932 ARMAMENT LIMITATION CONFERENCE

By Commander Lucius C. Dunn, U. S. Navy

AFTER a session interspersed with vicissitudes such as have characterized all preceding ones, the preparatory commission for the Disarmament Conference, meeting at Geneva last fall, finally evolved a draft convention for proposed use as a tentative agenda for the first general conference for the limitation and reduction of armaments, scheduled to convene at Geneva, on February 2, 1932, under the auspices of the League of Nations. The United States will be represented at that conference.

This draft convention consists essentially of a broad plan, contemplating in tentative outline the form which the proposed treaty will follow in effecting further reduction or limitation of world armaments—land, sea, and air. The convention comprises sixty articles, grouped in six parts.

Acting under the impulse of that proposed agenda, experts in the inner sanctuaries of land, sea, and air armaments offices over the entire globe are now busily engaged juggling statistics, devising budgetary equivalents for world monies, comparing tons and guns, yardsticking horsepowers and slide-ruling balloon volumes, separating reserves from the regulars and trying to decide when a reserve is not an "effective," tabulating bombers, fighters, scouts, and dirigibles, and a thousand and one other diversified functionary details pertinent to armament limitation endeavor.

As the text of the draft convention in its original form contains many involved footnotes, reservations, cross-reference indices to other treaty efforts, etc., rendering it cumbersome to ready digestion, the writer has undertaken to reduce it to a simplified topical outline, supplemented by essential summarized notes. It is hoped that this summary may prove convenient in readily comprehending the scope and subject matter proposed for consideration at the next very important conference on armament limitation and reduction.

Article I of the subject draft convention states that:

> The high contracting parties agree to limit and, so far as possible, to reduce their respective armaments as provided in the present convention.

The proposed agenda may be briefly indexed as per the following topical outline, the titles and subtitles of the index being identical with those of the original text of the draft convention:

Part I. (Personnel):
  Chapter A (Effectives)
  Chapter B (Period of service)
Part II. (Material):
  Chapter A (Land armaments)
  Chapter B (Naval armaments)
  Chapter C (Air armaments)
Part III. (Budgetary expenditure)
Part IV. (Exchange of information)
Part V. (Chemical arms)
Part VI. (Miscellaneous provisions):
  Chapter A (Permanent disarmament commission)
  Chapter B (Derogations)
  Chapter C (Procedure regarding complaints)
  Chapter D (Final provisions)

The sixty articles of the convention may be summarized as follows:

Part I. (Personnel).—Chapter A (Effectives): Arts. 2 to 4, inclusive. Proposes limiting average daily effectives in land, sea, and air armed forces organized on military basis. Defines forces "organized on a military basis," and prescribes method of determining "average daily effectives."

Chapter B (Period of service): Arts. 5 to 9 inclusive. Refers to conscriptive forces, and limits period for which called to service. Allows for increase in conscripts in event of reduction of regular forces (Chapter A), but League of Nations' permanent disarmament commission must be notified of such increase.

Part II. (Material).—Chapter A (Land armaments): Art. 10. Proposes imposing budgetary limitation for annual expenditures on land armaments.

Chapter B (Naval armaments): Arts. 11 to 24 inclusive. Proposes imposing budgetary limitation for annual expenditures on naval armaments, and

adopts 1930 London conference method for limitation numbers, guns, and tonnage of ships.

Chapter C (Air armaments): Arts. 25 to 28 inclusive. Specifies limitation of number and total horsepower of aëroplanes capable of use in war, in commission and in immediate reserve; also limits number, total horsepower and total volume of dirigibles, capable of use in war, in commission and in immediate reserve. Proposes imposing restrictions on: utilizing specially trained military personnel in civil aviation; embodying military features in construction of civil aviation material; and subsidizing, directly or indirectly, air lines for military purposes. Undertakes to encourage conclusion of civil aviation economic agreements in the different countries. Also contemplates adoption uniform rules for measuring horsepower, and specifies that volume of dirigibles be expressed in cubic meters.

Part III. (Budgetary expenditure).—Art. 29. Proposes imposing budgetary restriction on total annual expenditure on armed forces—land, sea, and air.

Part IV. (Exchange of information).—Arts. 30 to 38 inclusive. Proposes that periodic publicity be given (through the secretary-general of the League of Nations), by each of the high contracting parties, relative to personnel and material—including total amounts expended each year upon them—of the land, sea, and air forces of each country.

Part V. (Chemical arms).—Art. 39. Contemplates rules, based on reciprocity, to abstain from use in war of asphyxiating, poisonous, or similar gases, and of all analogous liquids, substances, or processes. Also undertakes, unreservedly to abstain from the use of all bacteriological methods of warfare.

Part VI. (Miscellaneous provisions).—Arts. 40 to 60 inclusive. Comprises miscellaneous provisions, a chief one of which proposes establishing a permanent disarmament commission for purposes of supervising and reporting upon consummation of the treaty. Also covers derogations, establishes procedure relative to complaints and specifies method of ratification and time of coming into force of treaty, etc.

Notes on Reservations

It is important to note that, in respect to proposed budgetary limitations, the American delegation at Geneva stated that, whereas they were unable to accept budgetary limitation in any form as far as the United States was concerned, they did not wish their attitude to constitute an obstacle to agreement on the part of other powers. They therefore stated that they were prepared to apply, as far as they were themselves concerned, direct limitation instead of indirect limitation, provided that some practical budgetary method were generally agreed upon, which would be sufficiently detailed and precise to constitute an effective means of limitation.

The French delegation stated that it could not accept specific limitation of professional soldiers in land or air forces unless provision was made for similar limitation in the case of sea forces.

The German delegation reserved its government's right to submit to the future disarmament conference any proposals regarding the standards of reduction and limitation of armaments which it might consider likely to promote these aims.

With regard to naval armaments the Italian delegation made a general reservation to the effect that the Italian government could not finally agree to any specific method before all the powers had agreed on the proportions and the levels of maximum tonnage.

Also in respect to naval armaments the Yugoslav delegation emphasized the difference between recently created countries at present engaged in preparing a minimum naval program compatible with their national security, and countries having a maritime history and tradition and possessing a complete fleet. The figure of the total (global) tonnage to be submitted for such small countries, would represent only the first stage in the execution of their minimum program, whereas for full-fledged maritime powers, such figures will really indicate their maximum naval forces in the present state of international relations. In view of this essential difference, the Yugoslav delegation reserved the right to request at the coming conference that such recently created countries, which are obliged to distribute their expenditures for minimum tonnage construction compatible with their national security over a number of years exceeding the duration of the convention, should be accorded the right to mention separately, within the limits of the agreed total (global) tonnage, what portion of the program they intended to carry out during the period of the convention.

The subject of publicity and exchange of information, through the League of Nations, bearing upon various elements of armament efforts constituted a source of much discussion and produced some formidable reservations on that topic, notably from Germany.

With respect to chemical arms, the German delegation was of the opinion that the

effect of prohibiting the use of chemical weapons would be incomplete unless it referred also to preparations for the use of those weapons, such as instruction of troops, etc.

From the number and complexity of the reservations on the various topics of the proposed agenda, it is manifest that clouds now hang heavily upon the limitation of armament horizon, and squally times would appear to be the forecast for Geneva next February. But if faith can remove mountains, it would seem that real, genuine, out-in-the-open international coöperation on the part of *all* powers represented should be able to dissipate a few clouds. And as for the squalls—well, real sailors never carry umbrellas and are not afraid of getting wet!

The question is: "How about the land and air forces—will they reduce and 'limitate'"?

Page Father Time for the answer.

SOME ASPECTS OF THE MERCHANT MARINE ACT OF 1928

By Captain Walter F. Jacobs, U. S. Navy

THE nation that controls the seas of the world controls the trade of the world, and the nation that controls the trade of the world controls the riches of the world, and consequently the world itself." So said Sir Walter Raleigh some three hundred and more years ago. Great Britain took that creed to heart at that time and has followed it ever since. It was the same creed that had been previously realized and lived up to for 700 years by Italy, by the Hanseatic League, by Portugal, Spain, and Holland; by all the great states that had held the command of the sea since the days of Tyre. The people of the United States inherited an inkling of this creed. In the early part of the nineteenth century the American clipper ship was the envy of the world. Ninety per cent of the net tonnage entered and cleared in the foreign trade of the United States in 1821 was of United States registry. In 1912 this net tonnage had fallen to 25 per cent. During and after the war the proportion of United States registry in foreign trade rose to 51 per cent in 1920, since which year it has decreased to 39 per cent in 1928. During the period from 1821, when the United States captured the North Atlantic trade (the bitterest competitive ocean) to 1860, just before our Civil War began, an average of 77 per cent of our imports and exports were carried in American bottoms; from 1861 to 1865, the period of the war, an average of 41 per cent; from 1866 to 1913, an average of 14 per cent; in 1928 an average of 33 per cent, which is about the same as in 1867. The total value of water-borne exports and imports in 1928 was $7,662,500,000 of which vessels of United States registry carried $2,574,000,000. A rightful share of this trade would be 50 per cent or $3,831,000,000. By not exercising this right our people paid freight and insurance charges on cargo to the value of $1,257,000,000 to carriers of Great Britain, Japan, Germany, Holland, Norway, and others. It would be interesting to know how much such charges amount to per year. However, such a computation, on account of the extreme complexity and variability of ocean freight rates, is difficult to average. This will be more fully discussed later in the paper.

In 1915 and the early part of 1916 the rates on many commodities exported from the United States to Europe, were more than five times the rates prevailing immediately before the war; and those on shipments to non-European neutral countries located far away from the war zones advanced 300 to 400 per cent. Many considered this to be the maximum that the traffic could bear. Later in 1916, however, it appeared that war traffic could seemingly bear an almost limitless burden. In 1917 the general index number was 785.3 as compared with 69.6 in 1914 and 100 in 1900. Ocean transportation is less competitive today than in the past; but is more competitive than rail transportation.

Principles of Transportation

Now, since we are once again realizing that we wish to transport our own goods in our own bottoms instead of in the vessels of our commercial rivals; since we no longer wish to be in the position of the great department store owner delivering his goods by means of his competitor's trucks; we must organize and increase our ocean transportation until we are able to deliver the service reasonably and equitably.

The United States was able to do this under sail. It can be done under steam and motor. Our colonial ancestors were in part a seafaring people; they needed a merchant marine as a means of transportation and communication; the shipbuilding trade grew as the demand increased, from a pinnace in 1607, a schooner in 1700 (built at Gloucester), the first square-rigger launched in Bath in 1760, the fleets of successful combination trading and privateering ships of the Revolution, the phenomenal growth afterwards. This growth was caused by a

natural demand supplemented by discriminating navigation laws made from 1789 to 1792 following the example of our competitors. The first of these laws, enacted in 1789, provided for a 10 per cent reduction in duties on imports brought in by vessels owned wholly by citizens of the United States. Later a tax was placed on shipments through indirect trade and tonnage taxes were enacted forcing American built and owned vessels. Still later a surtax of 10 per cent was placed on all importations in foreign flag vessels. At the end of 1789, 17 per cent of our imports and 30 per cent of our exports were carried under our flag; five years later, after the enactment of these laws, we were transporting 95 per cent of our imports and 90 per cent of exports. However, one of the clauses of the peace treaty of Ghent at the end of the War of 1812 forced the United States to repeal the discriminatory tariff laws of 1789-92. In spite of this serious repulse our shipping continued to advance and by 1821 we had taken the cream of the North Atlantic trade. It was in 1817, that the coastwise trade was wisely restricted to American flag vessels. During the period from 1821 to 1860 the net tonnage of American vessels entered and cleared in the foreign trade, increased from 1,570,000 to 12,000,000, while during the same period the net tonnage of foreign vessels engaged in this trade increased from 164,000 to 4,978,000. Of the net tonnage 29 per cent entered and cleared, and 33 per cent of the goods by value were under foreign flags. Then came the Civil War and at about the same time the growth of the iron-hulled steamship which was largely developed abroad; while the United States was occupied by a great war, followed by tremendous internal development absorbing capital and labor. From the beginning of the Civil War until 1910, there was a fairly gradual fall in the percentage of United States tonnage entered and cleared from 70 per cent to 22 per cent and at the same time a fall in percentage of value of merchandise carried by United States flag vessels from 65 per cent to 8 per cent. During this time, the total value of exports and imports increased about five times to $2,982,800,000 in 1910. During the period from 1910 until 1920 there was at first a gradual, then a sharp rise in percentage of American vessels cleared in the foreign trade and a lesser increase in the percentage of merchandise transported under the American flag. The total value of exports and imports in 1920 was $11,875,000,000, of which 42 per cent was carried in American bottoms. Even then we were not getting our reasonable share of 50 per cent although 51 per cent of the vessels entered and cleared in the foreign trade that year were of United States registry. From that time until 1928, there has been again a gradual decline in the amount of value of imports and exports carried under the American flag. The percentage in 1928 was 33, although in that year 39 per cent of the vessels entered and cleared were of American registry. The answer seems to be that: (1) We have not enough vessels in foreign trade; (2) those that we have are not getting the cargoes.

Mr. J. E. Sheedy, formerly vice-president of the U. S. Shipping Board, stated in a lecture delivered at the Army War College in 1924 that it is generally estimated that the freight and insurance charges approximate 7 per cent of the value of the products. He was speaking of normal times and this figure is of course to be taken in the most general way. However, if this percentage is applied to the foreign water-borne commerce of the United States for the years 1920, 1924, and 1928, and a comparison drawn between the freight rate and insurance that actually went to the owners of American flag vessels and the amount that would have gone to them under a reasonably fair division of the business—50 per cent, we arrive at a column of increasing losses.

ROUND NUMBERS

Year	Total value exports and imports	Total freight rates and insurance	U. S. owner got	U. S. owner fair share	Loss to U. S.
1920	$12,000,000,000	$840,000,000	$358,680,000	$420,000,000	$61,320,000
1924	7,000,000,000	490,000,000	177,870,000	245,000,000	77,130,000
1928	8,000,000,000	560,000,000	188,160,000	280,000,000	91,840,000

We were then in 1928 paying our competitors in world ocean-borne trade some $92,000,000 more than we should have done for transporting our goods. That is a lot of money; approximately the wages and subsistence of 95,600 American able seamen for one year or the interest of 6 per cent on a capitalization of more than one and one-half billions of dollars. This appears to be too large a sum with which to subsidize a foreigner's merchant marine. To what foreign nations does the money go? If we assume that the people of the United States as ultimate consumers pay freight and insurance rates (7 per cent of value) on all imports we find that in 1928 we paid in round numbers $83,000,000 to American shipping, $81,000,000 to British, $27,000,000 to Japanese, $13,000,000 to German, $11,000,000 to Norwegian, $10,000,000 each to the French and the Dutch and lesser amounts to a number of others; a total sum of $253,000,000 of which $170,000,000 went to our rivals in the trade of the world.

Now we cannot afford to depend upon our commercial rivals carrying our cargoes. We are by no means self-sustaining in resources. We must keep open markets abroad or curtail production. The Merchant Marine Act of 1920 sets forth a policy which is reaffirmed in the Merchant Marine Act of 1928, familiarly known as the Jones-White Act. Such policy is as follows: "It is necessary for the national defense and for the proper growth of its foreign and domestic commerce that the United States shall have a merchant marine of the best equipped and most suitable types of vessels sufficient to carry the greater portion of its commerce and serve as a naval or military auxiliary in time of war or national emergency, ultimately to be owned and operated privately by citizens of the United States." This act of 1928 sets forth a logical and practical means of carrying out this policy.

The Shipping Board upon the affirmative vote of five members, may sell any of its vessels only when the building up and maintenance of an adequate merchant marine can be best served by such sale. The board may recondition its vessels so as to equip them for competition in the foreign trade. The act recognizes the necessity for replacement of vessels controlled by the board and for the construction of additional up-to-date cargo, combination cargo and passenger, and passenger ships, to give the United States an adequate merchant marine; and directs the board to make recommendations setting forth what new vessels are required for permanent operation in foreign trade and their estimated cost in order that Congress may make the necessary appropriations. All vessels built for the board shall be built in the United States and shall be planned with reference to their possible usefulness as naval auxiliaries.

The act creates a construction loan fund for a maximum of $250,000,000 which shall continue to be a revolving fund; repayments on loans being credited to the fund, while interest is conveyed into the Treasury as miscellaneous receipts. This fund is partly made up from the sale of vessels; but largely from authorized appropriations. The minimum rate of interest is set at 3.5 per cent. No loan shall be for a greater sum than three-fourths the cost of reconditioning, or for a longer time than twenty years. The principal shall be repaid in equal annual installments definitely prescribed in the particular contracts. Proper security and insurance are required. This construction loan revolving fund is one of the greatest aids to our Merchant Marine in the foreign trade ever extended by Congress. Provision is made so that if a vessel, built by help of this fund, is removed from the foreign trade and placed in coastwise trade, the rate of interest is raised during this time from 3.5 per cent to at least 5.25 per cent, a matter of $8,750 a month on a vessel costing $8,000,000. However, there is no reason why such a vessel should not engage in a combination coastwise and foreign trade—for instance, New York, Havana, San Francisco, or east to west coasts via one or more Central American or Mexican ports. This may explain some of the opposition to the bill by certain United States interests. Of course the great opposition was directed by foreign shipping, working through American agents as always in the past.

The act then revises the ocean mail service. The Postmaster General is required to certify to the Shipping Board what ocean mail routes should be established; the board shall then certify to the Postmaster General the type, size, speed, and other characteristics of the vessels which should be employed. Such vessels are required to be steel, motor, or steam driven, registered

under the laws of the United States before February 1, 1928 (if built before that time) and during the entire time of such employment. Any vessels employed which have been built after the passage of this act must be constructed in accordance with plans and specifications approved by the Secretary of the Navy, with particular reference to economical conversion into an auxiliary naval vessel or a vessel which will otherwise be useful to the United States in time of national emergency. All licensed officers are, as always, required to be citizens of the United States and for the first four years, until May 22, 1932, one-half of the crew must be citizens. Thereafter, two-thirds of the crew shall be citizens of the United States. This is a most important clause, which will promote the seafaring reserve tremendously.

Contracts for the carrying of ocean mails shall be awarded to the lowest bidder, who in the judgment of the Postmaster General possesses such qualifications as to insure proper performance of the mail service under the contract. The vessels employed in mail service are divided into classes according to sustained speed and gross tonnage and compensated according to class. For instance, vessels in class 7—vessels capable of maintaining a speed of 10 knots at sea in ordinary weather and of a gross registered tonnage of not less than 2,500 tons—$1.50 per nautical mile. This would amount to $360 per normal day and would pay for 240 barrels of fuel oil at Panama Canal prices or seventy-two tons of coal at Newport News. A type crew for such a vessel would consist of thirty-six officers and men with a standard monthly wage of $3,399 and subsistence of $720, or daily cost of $137. We shall not go farther into this at present, but it can be seen that the mail compensation pays a substantial proportion of the normal sea operating expense of a vessel. For vessels of class 1, vessels capable of maintaining a speed of 24 knots at sea in ordinary weather, and of a gross registered tonnage of not less than 20,000 tons, the compensation is $12 per nautical mile, amounting to $6,900 per day: $37,500 for the voyage New York to Cherbourg; $63,000 for the voyage New York to San Francisco via the Panama Canal.

It is interesting to see that this act provides that naval officers on the active list may volunteer for service on any vessel employed in the mail service under the provisions of this bill and if accepted by the owner or master, may be assigned to such duty by the Secretary of the Navy. While in such service, naval officers receive half pay, exclusive of allowances from the government, and such other compensation as may be agreed upon. In making the appropriation necessary to carry out the provisions of this Merchant Marine Act 1928, provision is made that the United States may take and purchase or use at a fair compensation to be determined by the President: (1) Any vessel on which a loan has been made from this construction loan fund at any time during the life of the loan; (2) any vessel under contract for carrying ocean mails, during the life of the contract.

The enactment of this legislation is now showing its effect. Shipbuilding activities in home yards are advancing rapidly. Contracts for seventeen ships totalling nearly $70,000,000 have been made. These, with additional ships to be constructed under the mail contracts to be awarded, will make a total of fifty-two modern vessels, comparable to any in the world. "With the program now under way for the building of modern ships and with the people and the government solidly behind the movement to support American shipping, the success of an adequate privately owned merchant marine is definitely assured." The *Marine Engineering and Shipping Age* for January as quoted in the New York *Herald Tribune* gives a fair picture of the change that has resulted from the passage of the Merchant Marine Act of 1928. Prospects are more encouraging now than at any time since the war. In addition to the fifty-two vessels being built or planned for the ocean mail service, plans are being developed for the construction of at least 120 other vessels of various types. The output of fifty-four shipyards in 1929 was reported at 284,000 gross tons. Forty-eight of these yards report 215 merchant vessels of 359,460 gross tons now under construction. This tonnage under construction is an increase of 244 per cent as compared with that on order at the end of 1928. Sixty-three yards were active in 1929 as compared with forty-one in 1928. Among the outstanding vessels now under construction are two 18,500-ton liners for the Matson Navigation Company and one 7,000-ton passen-

ger ship for the New York and Porto Rico Steamship Company. The Newport News Shipbuilding and Dry Dock Company is building two 21,000-ton turbo-electric ships for the Dollar Line and two 11,300-ton turbo-electric ships for the Ward Line. The New York Shipbuilding Company is building four 8,500-ton passenger vessels for the Export Steamship Company and the 8,000-ton liner *Santa Clara* for the Grace Line, which is now (March, 1930) undergoing speed trials. Two 15,000-ton tankers are under construction at the Federal Shipbuilding and Dry Dock Company while the Sun Company at Chester is building a liner for the American South African trade and eight 9,000-ton Diesel tankers. A survey by the American Bureau of Shipping shows that tonnage under construction in American yards is increasing rapidly from month to month and estimates that the contracts recently awarded will keep 8,000 men employed for two years. The director, Department of International Shipping, Georgetown School of Foreign Service, Dr. Alfred H. Haag, writes in the Washington *Post* this winter that there are now employed in foreign trade 671 American flag vessels of 3,865,000 gross tons, a 500 per cent increase in number and 550 per cent increase in tonnage since 1914. The enormous Shipping Board tonnage of 1920 has been reduced so that now there are 3,280,000 tons in 595 vessels remaining under the board's control, of which 229 of 1,335,000 tons are in active service. "In 1928, 5,100 vessels of 23,000,000 gross tons, flying the flags of twenty-eight countries, transported 1,750,000 passengers and 100,000,000 tons of cargo passed through 1,600 American and foreign ports in the foreign trade of the United States. The combined passenger and freight revenues approximated $1,000,000,000."

It is difficult for the man in the street to realize the extent of sea-borne foreign commerce of the United States. Last year it was 113,000,000 long tons; the equivalent of dispatching railroad trains of fifty cars, each car holding thirty tons, at seven minute intervals day and night throughout the year. At least half of this transportation business is properly the right of the American people. That people has at last made a decisive move, through the Merchant Marine Act of 1928 to recover this right lost since the year 1862.

Let us assume a hypothetical freight liner of 12,000 gross tons, sustained speed of 18 knots to ply between Baltimore and Hamburg, a distance of 4,000 nautical miles. We shall call our ship the "SS. X-ray" and assume her cost in an American shipyard to be $2,000,000. The normal interest on such a sum in the open market may be taken as $120,000 or $10,000 a month. Now assume that $500,000 of this amount is borrowed at 6 per cent and the remainder at 3.5 per cent under the provisions of the act of 1928. We then get an interest charge of $6,875 a month or a saving of $3,125 from the normal interest charge. The "X-ray" would fall in class 3 of the Ocean Mail Service, thereby receiving a compensation of $8 per nautical mile or $32,000 per one way voyage which would normally take ten days. With a proper and normal turn around and with normal yearly overhaul and semi-yearly drydocking, eleven round trip voyages per year may be conservatively assumed. The mail compensation would be $352,000 per year or $29,333 a month. Adding this to the saving in interest, we find a sum of $32,458 a month in virtual subsidy.

A line of four such vessels would receive assistance of $1,558,000 per year. This is a marked advance over the $1,644,000 expended by the United States in 1927 as a direct aid to *all* foreign shipping. In 1927 when the United States expended this amount Great Britain expended $3,685,000; Italy $13,000,000; Spain $11,210,000; Japan $3,451,000; France $4,650,000. Turning now to the report of the Postmaster General for the fiscal year ending June 30, 1929, we find that the weight of mails dispatched by sea to foreign countries and possessions that year was 87,354,737 pounds, an increase of 5 per cent over that of 1928 and 54 per cent over that of 1922. The appropriation to cover this was $19,050,000 while the actual expenditure was approximately $17,000,000 of which 89 per cent or $15,000,000 went to American ships. The postage collected is estimated at $10,591,095, an increase of 13 per cent over 1928. During the fiscal year 1929, twenty-five contracts were let under the Merchant Marine Act of 1928 for transportation of mails to foreign countries. The Postmaster General states in this connection that the main purpose of the act of 1928 is to develop the American Merchant Marine and with that object in view those contracts require the placing in service of forty-two

larger and faster vessels and the equipping of four additional with facilities for carrying passengers and with refrigeration space. It is specifically required that twelve of these vessels shall be new, and some of the remaining thirty vessels will be newly constructed.

Now let us return to our fast freight liner the "X-ray" in service from Baltimore to Hamburg, eleven voyages per year, receiving monthly aid from the government at a rate of $32,458. Her gross tonnage being 12,000 the net tonnage may be assumed as about 8,000. We may conservatively estimate an average cargo load of 6,000 tons, assuming that she gets an approximately full cargo each way. Now freight rates vary so greatly that assumptions are difficult to make. Supposedly, rates will go down appreciably when the new ships are put in service. Between 1920 and 1924, the general average movement of ocean freight rates declined from an index number of 394.7 in 1920 to 142.6 in 1921 to 102.1 in 1924. In 1917 the general index number had been as high as 785.3 as compared with 69.6 in 1914 and 100 in 1900. However, if we use the figures of Dr. Alfred H. Haag, we may take the average value of a ton of cargo in the foreign trade for 1928 as $80 and the approximate average rate as one-eighth or $10 a ton. This is probably a fair average. It seems high for wheat or lumber or fuel oil, but is certainly exceedingly low for a cargo of automobiles, or machinery, or cotton. If we take this rate of $10 a ton for an average cargo each way of 6,000 tons, eleven round trip voyages a year, we arrive at a freight income of $1,320,000, which would be exceedingly satisfactory on the original investment, even without the government aid of $32,458 a month. However, the operating expense of such a vessel would be only a small part of the operating expense of the line, including the cost of enormous shore personnel required at home and abroad. For instance the United States Lines, in 1928 showed a net loss of $465,000.

In order to arrive at an idea of the operating expense, we shall examine the figures for the United States Lines for the fiscal year 1928. The figures given take account of all operating, repair, and betterment costs, lay up expenses, overhead costs, and a proper share of the administrative expenses of the Merchant Fleet Corporation. At this time, the United States Lines comprised the *Leviathan, George Washington, Republic, President Harding, President Roosevelt,* and in the latter part of the year the *America* returned to active operation after extensive reconditioning. These six vessels during the year made only sixty-one crossings of the Atlantic, carrying 201,894 tons of cargo and 88,891 passengers, at an estimated revenue of $16,266,178.98. The estimated voyage expense was $14,222,616.85, a profit here of about $2,000,000. However, there was an adjustment of $161,864.26, insurance of $408,627.30, maintenance costs of $964,214.51, betterment costs of $286,057.11, advertising $382,065.74, administrative cost $306,041.79, making a total expense of $16,731,487.56 or net loss of $465,308.58.

If we make certain reasonable assumptions and apply the ocean mail rates provided by the Merchant Marine Act of 1928 to these voyages of the United States Lines for the final year 1928, we shall turn this deficit into a reasonable profit. There were sixty-one crossings, assume thirty-one eastbound with mails, of which ten were made by the *Leviathan* and the remaining twenty-one by the other five vessels, all in approximately class 4; all voyages to Cherbourg, which is 3,125 miles from New York. We get a mail compensation of $768,750, turning the deficit of $465,308 into a net profit of $303,442.

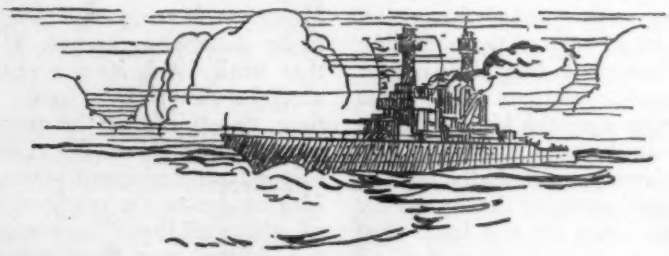
It seems sufficiently clear that the Merchant Marine Act of 1928 is promoting and will continue to promote the growth of a modern well equipped fleet capable of transporting a fair proportion, at least half, of the foreign commerce of the United States. It will also increase the number and quality of seafaring men, the basic naval reserve for war purposes. All licensed officers in our Merchant Marine have long been required to be American citizens. This act requires that until 1932, 50 per cent of the crews shall be American citizens and after that time, two-thirds of the crews. In the fiscal year ending June 30, 1928, there were shipped and reshipped in our total Merchant Marine, below the grade of master, 327,573 of whom all the officers and 54 per cent of the enlisted men were native born or naturalized citizens of the United States. Of these, there were shipped and reshipped at that time in the foreign trade, over-seas and near by, 21,795 native born and 12,729 naturalized citizens, officers below the grade of master, and 112,667 citizens out of a

total of 214,381 men, or 52 per cent. By May of 1932, this percentage must be increased by 14 per cent or, if the total number is not increased, by 31,500 men. This would give a total number of citizens shipped and reshipped in the foreign trade below the grade of master of 178,627, plus 58,000 in the coasting trade, a grand total of 236,627 able-bodied seafaring citizens from which to form a reasonable naval reserve in time of war. The number of men shipped and reshipped gives a fair approximate idea of the total personnel serving at any one time which in 1928 for a total of 27,842 vessels, 16,823,522 gross tons, was 212,000 officers (below the grade of master) and men. We may with reasonable conservatism add to this number 19,000 masters.

CONCLUSIONS

The act of 1928 will not only enhance the quality and the number of vessels under the American flag in our foreign trade and promote the quality and quantity of American seamen suitable for a naval reserve, but each vessel built in accordance with this act must, as set forth above, be constructed according to plans and specifications approved by the Secretary of the Navy, with particular reference to economical conversion into an auxiliary naval vessel or a vessel which will be otherwise useful to the United States in time of national emergency. This provision boils down to a measure for providing a naval reserve of cruisers, aircraft carriers, freight and troop transports, mine layers, and other craft likely to be needed by the government in prosecution of a war on the seas. Not only are the plans and specifications approved by the Secretary of the Navy, but a board of naval officers inspects the vessels building and when completed.

As treaties for the limitation and reduction of men-of-war are made and carried out, the status of the Merchant Marine as a primary means of waging war at sea becomes more important. Just as the Washington reduction and limitation of battleships treaty of 1921 caused an immediate growth of cruiser tonnage, so a limitation of all sea arms will cause greater dependence to be placed upon commercial tonnage readily convertible into men-of-war in time of emergency. If an agreement had been reached at London abolishing not only battleships, but all other vessels built specifically for war purposes, Great Britain, because of her overwhelmingly superior Merchant Marine, would retain a fair control of the seas of the world and with that control of the seas, a control of the trade, a control of the riches and a control of the world. The Merchant Marine Act of 1928 is a farsighted step to gain for the United States a proper share in the control of the seas in peace and in war; a proper share in the control of trade, of wealth, and of the world.



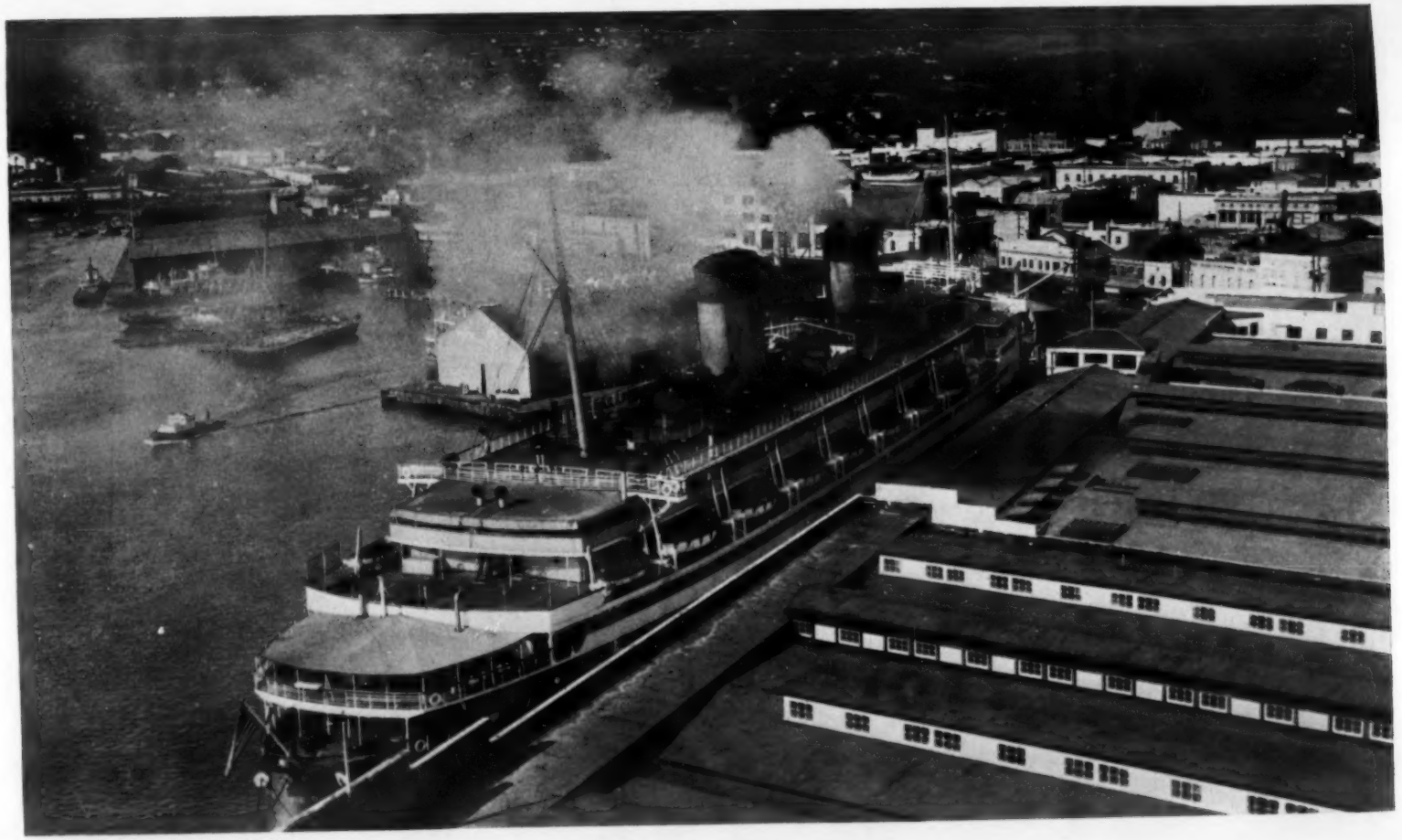
From Ewing Galloway, New York (R. Moulin)

A GLIMPSE OF AUCKLAND'S BUSY WATER FRONT

From Ewing Galloway, New York (De Con)

LENINGRAD COMES BACK TO LIFE—GREAT SHIPPING CENTER ACTIVE AS IN THE ROMANOFF DYNASTY
The canalized Neva River, as seen from the deck of the photographer's steamer.

LIFE BACK TO LIFE—GREAT SHIPPING CENTER ACTIVE AS IN THE ROMANOFF DYNASTY
The canalized Neva River, as seen from the deck of the photographer's steamer.



From Ewing Galloway, New York

A GLIMPSE OF HONOLULU HARBOR

By Ewing Galloway, New York

CHANGING CHINA

Fine modern warehouses along the water front of Kowloon, a part of Hongkong.

From Ewing Galloway, New York (R. Moulin)

SINGAPORE'S RIVER COLLECTION OF PUMPKIN-SEED SHAPED SAMPANS RIVALS THAT OF CANTON'S

From Ewing Galloway, New York (R. Moulin)

THE NEW MANILA

By Ewing Galloway, New York

THE OYSTER FLEET AT BIVALVE, NEW JERSEY

From Ewing Galloway, New York (R. Moulin)

SYDNEY HARBOR BRIDGE, LINKING TWO HALVES OF THE CITY

The bridge is the second largest of its kind in the world, and has the second longest arch span—1,650 feet as compared with the new Kill Van Kull bridge, New York, 1,652.

the new Kill Van Kull bridge, New York, 1,652.

From Ewing Galloway, New York (R. Moulin)

HONGKONG'S WONDERFUL PICTURESQUE HARBOR—A MAGNIFICENT LITTLE BAY FENCED IN BY MOUNTAINS

From Ewing Galloway, New York (R. Moulin)

SHANGHAI WATER FRONT

By Ewing Galloway, New York

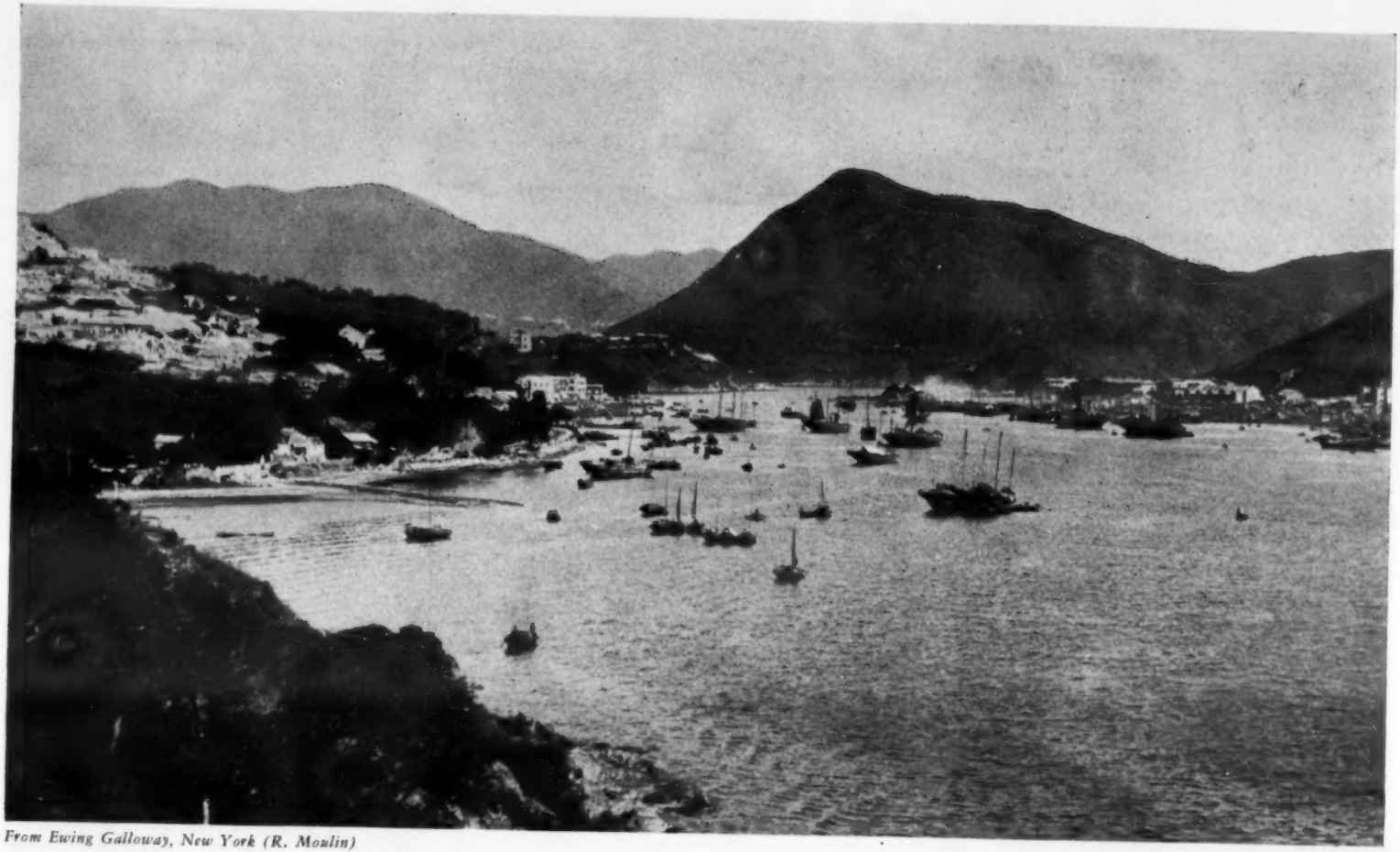
A NEW CAMERA GLIMPSE OF HONGKONG

From Ewing Galloway, New York (R. Moulin)

CHINWANGTAO, THE SEAPORT FOR PEIPING AND TIENTSIN

From Ewing Galloway, New York (R. Moulin)

THE WEST PRAYA IN HONGKONG LOOKS LIKE A WATER-FRONT STREET IN A MODERN OCCIDENTAL CITY



From Ewing Galloway, New York (R. Moulin)

VIEW ON THE BAY ON THE SOUTH SIDE OF THE ISLAND OF HONGKONG

VIEW ON THE BAY ON THE SOUTH SIDE OF THE ISLAND OF HONGKONG

International Newsreel

ICHANG WATER FRONT

From Ewing Galloway, New York (R. Moulin)

REPULSE BAY, HONGKONG'S SILK STOCKING DISTRICT

RECRUIT TRAINING

By Captain G. J. Rowcliff, U. S. Navy

It is easier to know mankind generally than man individually—LaRochefoucauld

IT IS the object of this paper to erect a sort of signboard for the consideration of those responsible for the training of enlisted men soon after their enlistment in the Navy, with the hope that the collective and joint performance may be enhanced.

It is purposed to discuss in some detail for the better general and mutual understanding, what ought to be done in the training of recruits for the Navy; and what can be done in the time available with the means available. The collateral points of importance to us as responsible officers are two:

First, a comparison between what *ought* to be done, and what *can* be done, on the one hand, as against what *is* done on the other hand, by way of pointing the way toward improvement.

Second, a clearer conception on the part of each person concerned as to what his share in the task is—specifically, a better realization of the limitations as well as the potentialities of a training station as related to what remains to be done after the recruit goes aboard his first ship.

The impulse to attempt such a complicated discussion springs from a fundamental belief that the personnel of the Navy is the most important part of it and from the further conviction that it is not nearly so effective as it ought to be. The Navy in the long run is just as good in character as its personnel; and is, by no possible chance better than its personnel. To be sure, the personnel cannot create initial money and materials; but, given these, the personnel becomes at least the limiting feature. It creates and operates in proportion to its quality.

If the Navy be composed of 100,000 men and even as many as 10,000 of these are not of such quality as they should be, there is a loss of efficiency which can be improved considerably. This is the more important when one considers that, on an undermanned ship, one raw boy is expected to do the work of one-and-a-fraction seasoned men in time of peace, and to extend himself still further when an emergency arises.

One is reminded also that in the whole service the turnover of enlisted personnel is large. Our Navy is not, generally speaking, a career for most men. To be sure, some men do remain for sixteen and twenty years, but our retirement laws are such as to make it attractive to pass into civil life as a part of an important, if aged, reserve. Very many men do not spend more than one enlistment in the service, and even during first enlistments the wastage is large. Consequently, the result of many separations is a large annual replacement problem; and the whole service becomes an intensive training service.

The inevitable inference from these considerations is that the Navy might be a better and more efficient Navy if there were *fewer* recruits, which opens up the complicated questions of rates of pay, standards of living, and commercial competition for good men. So, discarding this conclusion, we pass on to the idea that the Navy would be improved if there were *better* recruits.

It is not purposed in this paper to consider in detail the matter of recruiting, but rather, accepting the recruit as he comes out of the recruiting station, to investigate what can be made of him. It will be inevitable that consideration will reveal that a certain initial quality in the recruit must be expected before any work is done on him.

One must appreciate the fact that, in a service comprising fewer men than battle stations, the average quality of the unrated men becomes a matter of major importance. On July 1, 1930, of the whole enlisted strength of the Navy roughly 50 per cent were in the lowest ratings, not yet having reached the lowest petty officer grade in any branch. If then we remember that good men can, and often do, reach the grade of second class petty officer during the first enlistment, one can only admit that *no matter how good* some of our older men may be,

REPULSE BAY, HONGKONG'S SILK STOCKING DISTRICT

each can perform only one man's duty at most, and that the effectiveness of the service, by and large, is consequently no better than the quality of the men who are in their first enlistments. Truly the strength of a chain is no greater than its weakest link!

The first enlistment man therefore begins to loom rather large, does he not? What we do with and for him therefore is one of our most important problems and duties.

One may arrive at the same conclusion by looking around on board ship at any formation or evolution which one attempts to carry out. One may go farther and record how long each of the men composing a unit has occupied his present battle station. Having arrived surely at the conclusion that first enlistment men are of primary importance, one must accept, as a product of general human experience, that the kind of start he receives is vital. A part of this conception is the vital importance of *continuity* in early training and indoctrination.

This brings us to one of the major objects of this paper, for it is believed that just at this point there exists considerable misconception, and a considerable No Man's Land. My observation is that the recruit cannot help himself much in this matter at this time and that the division officer generally does not bridge the gulf between himself and the company commander at the training station. One must admit, however, that this matter is no simple one. No one can perform a task he cannot see. It is my desire to illuminate the task.

Just here it is appropriate to observe that our recruit is not *men* in the abstract. Each is an individual. Character is individual; training is individual. A recruit has a given characteristic, or he has not; he has been trained in a specific matter, or he has not. Specifically, he may have been absent the day the company was instructed on a certain point.

He will be effective collectively, as *men*, only if effective individually as recruit. One may verify this, if desired, by placing a raw recruit in an important position in a fast gun crew, or in the race boat crew.

He is far more important than just his own personal effectiveness. If he is defective or ineffective, someone must lose time on parental supervision or more, depending on how ineffective or how pestiferous he is, as the case may be.

Thus the company commander at the training station and even more the division officer on board ship must realize the major importance of their problem in handling the recruit who in both cases, is given to them to do with and for, therefrom to make an asset or a liability as best they may. But keep this in mind quite clearly, of the two the task of the division officer on board ship is the more individual. It is he who must pick up the individual threads where the company commander dropped his more collective and cruder effort.

Obviously, the initial step in determining what we are to do with the recruit is to decide definitely what we should desire him to be at the time he ceases to be a recruit, which from practical considerations we may set as one year after enlistment when he well might be seeking advancement in rating if he is all we hope him to be.

Since there is a divided responsibility it is desirable, after we have decided on what qualifications our finished recruit is to have, to speculate at least on what part of the responsibility should be borne by the recruiting officer, the company commander, and the division officer in turn, fully realizing that whatever the detail which one of these cannot, or does not, supply, the next in turn must try first to recognize the deficiency and second to remedy it.

It may be accented here that there *is some* deficiency in each recruit and that the effort to recognize the deficiency in the individual recruit is a large part of the problem, and is an important responsibility of the three officers aforementioned which they must accept as a major duty. Again one must reiterate that all recruits are individuals; they are all different. How can they fail to be, having spent eighteen years in far different families, schools, and employments? To be sure one has cut their hair, scrubbed them, put them in uniform; but in a bare two months or so one cannot change the inner man much. One can begin an improvement. The problem before us is to keep it growing at a maximum rate.

Thus, it is the more important that the individual problem be understood, and that each agency begin where the previous one left off, gently and tactfully if possible, but none the less firmly and efficiently.

The consummation of this effort may be said roughly to be to keep our engagement

with the recruit in helping him make a better man of himself; and in return to secure in a minimum time his maximum capability and whole-hearted coöperation in helping us make a better Navy. It is doubted that a full result is produced in all cases.

Again, the accent is on the individuality of the matter. An individual who has the initiative and the authority must do the thinking and the work; another individual without either must receive the training.

Let us keep in mind as we proceed that a recruiting officer has great power of selection. We might suppose that he is somewhat limited in choice to what is offered; but such is not the case. His task is far more active than that, for while he may have a waiting list of names to select from there may be no suitable material on it. He may have to realize that good recruits *never* are got easily; and he may have to work to create interest and attract them. This, then, is how he exercises his power of selection. It follows, however, that the better the initial human material, the more artificial the interest may be; and hence the greater the necessity to continue the effort after enlistment.

The recruiting officer also has that particularly important position in the scheme of indoctrination which arises from the fact that first impressions are strong ones. It is particularly important for the recruiting officer, first of all, to recognize the qualities of each recruit rapidly; and by carefully chosen words to indoctrinate him with just the right word which that particular recruit needs to stimulate his interest on the one hand and to begin to remodel him for the service on the other hand. Do not forget that he has to be remodeled to fit into the Navy. If one but visualize himself dropped, green and raw, from a widely different environment at the age of eighteen on board a modern man-of-war, wishing vaguely and curiously to make himself at home and to be useful, this point will be clearer.

In considering recruit qualifications one cannot fail to be struck by the vast number of them. Is it possible that this recruit can have so many? One is accustomed to using a check-off list to prepare a gun for firing lest it break down or blow up. The recruit is far more valuable, far more complicated; and I venture to say receives no such attention whatever from many officers, very little from most. While it is obvious that a human being cannot be made subject to such arbitrary diagnosis and treatment as can a piece of mechanism, nor is exactly such treatment desirable, nevertheless improvement consists of many components which can be nurtured best by the responsible person if detailed consideration be given and specific faults be recognized. The essence of the matter of course is that it requires more attention than is now being given, even though it be not attempted in quite such detail as our study indicates to be possible.

One may further criticize that we cannot expect our recruit to be perfect. True enough; but we are considering only what we should like him to be in the measure necessary for our purpose. There are many things we do not expect at all of him, and other things only in moderate measure.

For convenience in indicating major *initial* responsibility, let us use in places the abbreviations *R*, *T*, *S*, for the recruiting officer, company commander at training station, and division officer on ship, respectively. Let us remember that the first of these must do what he can in one day more or less; the second, in nine weeks; the third in forty weeks. Just the time available, partly shows the potentialities of each. The point, however, is to do the best work while the recruit is most receptive, nearer the beginning of the year than the end.

In all probability we shall find in most recruit qualifications a divided responsibility, but this is not objectionable. The valuable point comes out of the recognition that there *is* responsibility. The fact that it is divided makes it necessary for each to provide himself with enough information to begin at the right place. In qualifications which require appreciable time for development, the time available must be the essential measure of the responsibility.

Personal qualifications are of two sorts, physical and mental. The physical qualifications are plain enough, so tangible in fact that specifications are written in detail and delicate instruments are designed to detect the tiny abnormalities.

For our general purposes the recruit is composed as follows:

PHYSICAL QUALIFICATIONS

Agility; dexterity ..... *S*
Appearance ..... *R T*

Health .....*R*
Mental soundness.....*R*
Organic and functional sufficiency.....*R*
Posture .....*T*
Strength and endurance.....*S*

The mental qualifications are of two sorts, which may be called subjective and objective. The subjective qualifications may be considered those of the spirit. Some have called them moral constituents. These are the qualifications which determine a man's character. These are the characteristics which are by all odds the most important. It almost may be said that if our recruit but possess an ample share of each of these it makes little difference in the early stages whether he knows any specific fact or can perform any specific feat. He will be valuable and he can be taught.

This is by far the most difficult part of the task of analysis, and likewise the most difficult to handle practically because so abstruse. It is alike the most important and the most neglected, but a wise training must consider it. The means of achievement may be disguised or indirect, but the best possible results in this field must be produced.

Just now all the world (including ourselves) is interested in psychological tests both for human mental power and agility, and for mechanical dexterity. These tests seek to classify a man mathematically somewhere between a possible moron and a solon. The object of these tests of course is to determine what a man can be expected to produce for the corporation. To such a degree is this carried that we are assured that men can be selected with mathematical precision to be good bricklayers, expert accountants, or what you will, if one but have a sufficient number from which to select. This matter has gone to some lengths and some operators seem to have lost some of their sense of proportion and common sense. These products of modern science are very important as aids, but deeper qualities are required first as foundations for the Navy. We may well say that in emergency what a man is, in character, already will have fixed his value, beyond his mental agility or his manual dexterity at some past time.

Let us start to build his character for the Navy by attending to the following list of items. The items are numerous to be sure, but a little studious consideration reveals the fact that there are many human virtues which have been omitted.

It may be criticized again that we cannot expect our recruit to be perfect. Such is the fact, and the answer is that we do not expect him to have a maximum in any one characteristic—only so much as is needed for a proper bluejacket. As a matter of fact the essence of each of these broad virtues, as applied practically to our recruit, may be epitomized in one or two terse sentences amplifying the word itself in a general applicatory manner suitable and sufficient for an enlisted man's indoctrination.

If one should believe any of these listed virtues to be unimportant for our purposes one but has to imagine what our recruit would be if entirely devoid of any one of them!

SUBJECTIVE QUALIFICATIONS

Ambition
Alertness (attentiveness)
Cheerfulness
Chivalry (modified generosity)
Conscientiousness (dutifulness)
Coöperation (teamwork)
Courage (fortitude)
Determination
Enterprise (including curiosity)
Enthusiasm (spirit)
Force
Honesty
Initiative
Intelligence
Industry
Justice (fairness, sportsmanship)
Loyalty
Obedience (amenability)
Patriotism
Perseverance
Perception
Pride
Reliability (trustworthiness, dependability)
Responsibility
Respectfulness
Reverence
Self-respect
Self-restraint
Sincerity (truthfulness)
Sociability
Subordination
Tact (courtesy)

It may be reiterated that if our recruit possess these in reasonable degree, he will be valuable because he can and will learn how to do any reasonable task in a reasonable time, given reasonable physical attributes. These then are the important elements to be stimulated early by some means or other, direct or indirect. It remains for those re-

sponsible to devise means for observing deficiencies, and for instituting collective or individual methods for correcting them.

It must be recognized that the recruiting officer can have some part in this matter as a product of his investigation into a recruit's local reputation and family environment. This is most important. Nothing which is subsequently done can take the place of a proper bringing-up; and this proper bringing-up having been acquired in the recruit, it must be guarded and preserved as an asset in service. The recruiting officer himself cannot do much by way of *developing* the above characteristics in a recruit who is deficient. That must come later. He should, however, provide the recruit with that most important psychological element—the proper initial point of view, and sufficient detailed and concrete information to make his way smooth during the next stage of his advance to the training station.

Subject to the observations just made, the primary responsibility for the initial indoctrination of the recruit in the supremely important moral qualifications mentioned above should be considered as a responsibility of the training station, to make as much progress therewith as time and means, both direct and indirect, permit.

The aforementioned physical and subjective mental qualifications are the source from which spring actions, which are so important ultimately—the recruit's behavior and performance. Proceeding therefrom, a recruit's qualifications in action may be divided for convenience into three general headings:

OBJECTIVE QUALIFICATIONS

(a) Personal habits.—T
Associates, male and female
Attentiveness
Cleanliness; neatness
Conduct
Frugality
Helpfulness
Language
Manner (bearing, smartness)
Promptness
Routine actions
Thoroughness.
(b) General education.—S
(Standard subdivisions)
(c) Professional training.—T
Vocational
Avocational

Just at this point it is well to notice how far we have come in the qualification of our recruit without even having begun to consider any one professional thing he knows or can do for the Navy.

It is also worthy of note that the qualifications mentioned heretofore are the most valuable ones aboard ship and are those to which the least concrete attention normally is given, probably because too often taken for granted.

The professional qualifications mentioned below are items of training primarily, which must be divided eventually between the training station and the ship. In order to avoid a too lengthy concatenation only enough items of professional training will be mentioned to indicate a line of cleavage between the training station and the ship.

Just here it is well to remember that a training station has four primary broad functions to exercise, and that these require a considerable amount of time without adding visibly to the professional skill of the recruit:

Outfitting the recruit
Physical examinations, including dental work
Classifying the recruit for further training; psychological tests
Preparing the recruit for assimilation on board ship

When it comes to the strictly professional qualifications of the recruit—to live aboard ship and be useful, and properly to carry on in the Navy—the training station can do much in a preliminary way, chiefly by way of preparing our recruit for further successful training. It will plan and execute all it can; but, insofar as any individual recruit is concerned, it may be considered certain that far more will have been planned than the individual actually could receive and assimilate. While the training station is highly individual in some of its efforts, it is unavoidably highly collective in some forms of instruction.

Thus it is evident that, if due attention be given (as it should be) to the essentials already mentioned, there will be an absolute limit to what can be accomplished in less than ten weeks at the training station; and it is not surprising if the individual recruits are "spotty" and show "holidays" in their preparation because there is too little time to repeat. Repetition at such an age is normally a fundamental necessity, especially if the subject matter be quite new.

However, we shall proceed to consider

those things which ought to be covered if it be possible. There is too much material for training to permit more than touching upon most items, and we must resort to selection. It is obvious that many desirable professional items must be given up reluctantly as possible functions of the training station; and must be considered definitely as a part of the division officer's responsibility on board ship.

The following may be used as a general outline of classification:

VOCATIONAL TRAINING

1. End in view.....T
2. Naval life in general.....T
3. Disciplinary system.....T
4. Means of advancement .....T
5. Seamanship .....T
6. Gunnery .....T
7. Communications .....T
8. Engineering .....T
9. Medical and sanitation.....T
10. Conservation .....T
11. Sources of information.....T

AVOCATIONAL TRAINING

1. Means of recreation.....T
2. Athletics .....T
3. Games .....T
4. Music .....T
5. Specialties (stunts) .....T
6. Mass singing .....T

The items mentioned under "Avocational training" seem to require no further explanation here; but the subdivision of the aforementioned items of "Vocational training" is as follows:

1. *End in view*
   - Value of a career
   - Value of self-improvement
   - Selection of an objective
   - Idea of service
   - Significance of responsibility
   - Value of a good record
   - Value of good conduct
   - Value of a good reputation
   - Classification for further service
2. *Naval life*
   - Assistance in difficulties
   - Bedding (mark, swing, lash, stow, air, scrub)
   - Billet numbers
   - Clothing (marking, stowing in bag or locker, scrubbing)
   - Customs
     - Cleanliness of part of ship
     - Colors
     - Mess gear
     - Noise; whistling
     - Orders, understanding; replies
     - Quarter-deck manners
     - Salutes
     - Standing at attention
     - Smoking
     - Trash; throwing things over side
   - Drills; instruction
   - Formations
   - Going aboard
   - Leave and liberty (procedure; clubs, Y.M.C.A., etc.)
   - Mail; addresses
   - Meals
   - Organization of ship, general
     - Divisions
     - Quarter bill, etc.
   - Pay and allotments
   - Personal contacts
     - Officer of the deck
     - Division officer
     - Division petty officers
     - Chaplain
     - Shipmates
     - Associates, etc.
     - Sentries
   - Quarters
   - Routine, sea and port
   - Ship's service
   - Uniforms, recognition of
   - Writing home
3. *Disciplinary system*
   - Authority and responsibility
   - Articles for the government of the Navy
   - Complaints and grievances
   - Chain of authority
   - Discipline, necessity for
   - Duty; obedience; deference
   - Honors
   - Mast
   - Navy regulations
   - Offenses
     - Clothing, giving, lending, selling
     - Gambling
     - Leave breaking
     - Breaking arrest
     - Property of others, etc.
   - Punishments, methods
   - Records
   - Rewards and privileges
   - Ship's orders
4. *Advancement*
   - Effect of experience, conduct, record
   - Examinations
   - Instruction
   - Ratings available
   - Training courses
5. *Seamanship*
   - Alarms
   - Bearings and courses; compass, relative
   - Boats
     - Types and uses
     - Parts
     - Equipment, especially motor boat
     - Hook on; lower
     - Lifeboat, rigging, manning
     - What a "bow hook," or "stern hook" should know
     - Rowing
   - Emergencies
   - Ground tackle
   - Knots, bends, hitches simple
   - Lights, simple, running
   - Lines

Heave
Belay
Coil down
Mooring, names of
Nomenclature and phraseology, simple
Orders to helm
Orders to engines
Parts of ship, principal
Rules of the road, boat, simple
Rigging on mast, boom, gangway
Sounding, hand lead
Types of ships and aircraft
Swimming; falling overboard
Watches
Anchor
Communication
Fire- and engine-room
Fire control
Lookout
Plane, crash alarm, boat box
Sea
Sentry

6. *Gunnery*
Explosives, simple precautions
Field gun drill
Gun, principal parts of
Infantry drill, manual, marching, simple evolutions
Marksman's course
Rifle, principal parts of
Purpose of gunnery exercises
Value of team work

7. *Communications*
Alphabet flags
Semaphore
Special flags and pennants, principal
Telephone and voice tube, use of; calling; answering

8. *Engineering*
Auxiliaries, principal
Boilers and engines, location
Call bells
Dogs: doors, hatches, airports
Economy: water, light, heat, power
Gasoline, precautions
Switches, simple, operation
Valves, simple, operation

9. *Medical*
Bathing
First aid
Hygiene, personal
Sanitation
Teeth, care of

10. *Conservation*
Clothing
Electricity
Frugality, as a habit
Mess gear
Steam
Stores
Water
Own money
Civilian clothes
Lending and borrowing
Installment buying
Insurance
Jewelry
Navy Relief
Red Cross
Salesmen, high pressure
Savings
Suckers

11. *Sources of information*
Bluejacket's Manual
Bulletin boards
Division officer and petty officer
Library
Offices; yeomen
Officer of the deck
Routine board
Ship's paper
Station bill

The outline above goes considerably beyond existing or possible requirements for training stations; and is far beyond what a training station can accomplish effectively in nine weeks, even although it plan to cover this ground as best it may in order to be of maximum usefulness to the fleet. It may be accepted that a good recruit may not have received and assimilated as much as half of the program. This program then indicates something beyond the outside limit of a training station's effort insofar as an individual recruit is concerned. The list is important in that it indicates in what details the instruction must be resumed on an individual basis after the recruit leaves the training station. If from the mass of possibilities one be forced in emergency to choose the three outstanding features of the early training on which to concentrate it is probable that they would be:

First, the ability to keep neat and clean in person and equipment under unfavorable conditions.

Second, a working knowledge of the naval disciplinary system. By "disciplinary system" is meant something far deeper than a mere application of punishments to offenses. It begins at the root, with authority, responsibility, obedience, and respect.

Third, an indoctrination with the proper attitude of mind, or point of view, in passing from shore to ship.

Considering the vast scope of the possibilities, it is beyond peradventure a reasonable conclusion that, even though the man coming from the recruiting station be of good quality, the training station will be hard pressed to do more than touch on the more urgent requirements of the recruit to enable him to carry on successfully and happily. Indeed the ultimate field is so large that with the most intelligent planning and

regular execution the division officer may have difficulty in covering the remaining ground by the time one year's service is finished.

It has been a primary purpose of this discussion to bring out how extensive the field is, particularly in some features too often forgotten and neglected; and how great the necessity for careful planning and progressive execution. As said early in this paper, somewhere between the work at the training station and the training on board ship there is very apt to be a gap. Training stations ordinarily cover considerable ground in the time available; and achieve a relatively high degree of collective obedience, smartness, interest, and enthusiasm. These are great assets to be carefully nurtured. No vestige of disappointment, disillusionment, carelessness, slovenliness, should be allowed to creep into a recruit's life. That this sometimes happens is a fault. Any such "slump" by all means should be prevented, first on account of the value of the recruit himself in becoming an effective unit in his station as soon as possible, and second, because the recruit may become a petty officer.

The naval service needs all possible improvement in its petty officers. If one pessimistically has wondered sometimes what becomes of the high-class well-educated lads who are enlisted, this particular point supplies one of the reasons. The remainder of the reasons belongs in another discussion. It is quite certain that the handling of the recruit in the first few weeks after he goes aboard ship often determines whether he will be of high permanent value to the service, or be lost to it permanently, leaving the inferior man of little quality, little enterprise, little intelligence, to remain and drift into a position of responsibility.

Various devices have been tried to improve the training of recruits aboard ship. It is thought advisable at this point to disclaim advocacy of any specific artificial arrangement, such as the "recruit division," as a remedy. It may suit the situation; but on the other hand it may be impracticable for one of several reasons—the recruits may become too few, or may arrive too irregularly; or the organization may become inconvenient or the divisions be too short-handed before recruits arrive; or similar reason.

It is affirmed, however, that the division officer first of all requires recognition of the project as such; and requires assigned time in which to carry on the training. This is a matter for definite administrative arrangement by senior officers.

Second, he requires competent assistance. The division officer usually is in no position to choose his assistants. The petty officer instructors of the recruit at the training station are of advanced rating, are experienced, and are themselves especially instructed for the task. The division petty officer usually cannot be so competent by any means, but *any* petty officer will not suffice. The contrast between a competent instructor and an inferior petty officer is too great a shock. One chief petty officer answered in response to an inquiry that the keenest surprise he found as a recruit going on board ship was that he did not work for an officer as he expected, but always for a petty officer.

There are two fundamental requirements for an instructor—first, he must be qualified and prepared in the subject matter of the instruction; second, he must inspire the respect of the pupil. How many of our division and section petty officers fulfill these requirements, when looked at through the eyes of a fairly bright young man who has enjoyed a reasonably good bringing-up, who has finished grammar school and perhaps one or two years of high school, and who is receptive and ambitious?

The consequence is reduced to this, inferior petty officers infallibly perpetuate their kind. Therefore, it follows that only the best should be selected to instruct and to set an example for our recruit, for our best recruit will become rapidly either the useful seaman or petty officer of tomorrow, or will pass quite as rapidly out of the Navy. It is quite plain that, if this precaution be not taken, the better recruit will pass on to other fields, while the inferior one will remain to perpetuate mediocrity or worse among the lower petty officers.

It is equally plain that, if early care be taken thus in handling our recruit, improvement infallibly will result in our petty officer, a consummation highly to be desired.

BATTERY EFFICIENCY

By Lieutenant H. A. Guthrie, U. S. Navy

SUBMARINE personnel are accustomed to measuring battery grounds that exist on the ship in volts. The magnitude of these grounds is ascertained by using an instrument known as a ground detector. Unfortunately, however, such a ground reading neither isolates nor indicates all of the grounds which exist. In fact the reading obtained may be the measure of a portion of an electrolyte path which has actually formed a short circuit. A ground is a current carrying path in which no current can flow until it is connected to the conductor of opposite polarity. However, if a ground exists on each conductor of a circuit, these two grounds will unit through the hull and form a short circuit. Such short circuits cause an appreciable loss in battery efficiency.

The word ground implies an illusive something on which you cannot readily place your finger. A close relation actually exists between a ground, a short circuit, and the measurement of a potential difference that exists between the positive and negative conductors of a circuit. Even our everyday electrical appliances, such as a percolator, toaster, or electric iron employ the same principles.

To demonstrate the relation that exists between an ordinary household appliance, a voltmeter, and a short circuit, consider the circuits shown in Figs. 1, 2, and 3.

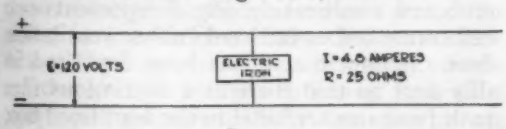


Fig. 1

In Fig. 1 there is represented an ordinary household iron which has a resistance of 25 ohms connected across a potential difference of 120 volts. The current flowing is 4.8 amperes, a small amperage, and the circuit fuses accommodate this flow. The total power of this circuit is $EI = 120 \times 4.8 = 576$ watts.

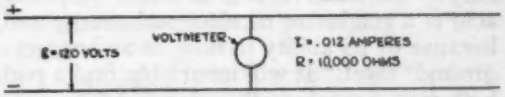


Fig. 2

In Fig. 2 there is represented an ordinary voltmeter which has a resistance of 10,000 ohms connected across a potential difference of 120 volts. The current flowing is .012 amperes, a very small amperage, and the circuit fuses accommodate this flow. The total power of this circuit is $EI = 120 \times .012 = 1.44$ watts. Such an instrument would consume one kilowatt hour of work in about 700 hours, or 29 days.

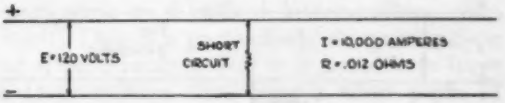


Fig. 3

In Fig. 3 is represented a short circuit which may be just an ordinary piece of metal, such as a wrench. Assume that this wrench has a resistance of .012 ohms and is connected across a potential difference of 120 volts. The current flowing is 10,000 amperes, and the circuit fuses would not stand this flow. The total power of this circuit is $EI = 120 \times 10{,}000 = 1{,}200{,}000$ watts = 1,200 kilowatts.

It can be seen that the resistances of the above circuits play an important part. Very little power is lost in the voltmeter circuit. Enough power is consumed in the electric-iron circuit to generate the required heat. Fuses, circuit breakers, and similar devices are installed in all electrical circuits to prevent the short circuit condition from remaining in the circuit longer than a fraction of a second.

A ground differs from each of the above circuits in that it is never connected to both conductors of the circuit. However, if our old "ground" or "parasite" creeps into the circuit, it may cause the loss of considerable

electrical energy which might be otherwise used to obtain useful work. It is an unwelcome thief which robs the energy that has been stored away in the electrical cells of a battery. A ground may be composed of any material which will carry current, and hence the resistance of the ground is determined only by the material and its shape. Sulphuric acid is a conductor of electrical energy and, because of its ability to flow, is an energetic ground "thief." It will invariably find a path between one terminal and ground or even between two terminals of opposite polarity. If the path is to ground, the circuit is a ground. If the circuit continues to grow until the acid bridges across two terminals of opposite polarity, the circuit becomes a short circuit.

It is impossible to measure the resistance of a ground by merely placing a voltmeter across the ground path. Figs. 4, 5, and 6 illustrate grounds and their measurement by a ground-detector voltmeter.

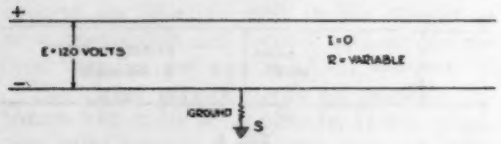


FIG. 4

In Fig. 4 is represented a true ground where the conducting medium, between the negative terminal and the ship's hull *S*, is sulphuric acid. Obviously no current flows and this ground is quite harmless in its present state. The resistance of this ground may be determined by the use of a bridge megger or by employing the Wheatstone bridge method if the exact path can be determined.

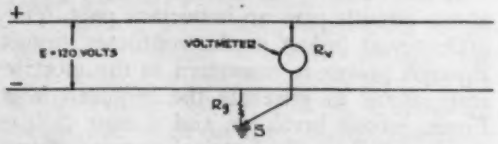


FIG. 5

In Fig. 5 is represented a voltmeter connected from the ship's hull to the positive terminal. Current can now flow from the negative conductor through the ground to the voltmeter and thence to the positive conductor. This is a complete circuit and the voltmeter indicates the potential difference existing only across this meter. However, the whole circuit now lends itself to a solution. Ohm's law applies where $E = IR$. It should be noted that we have two resistances in series. These resistances are that of the voltmeter R_v and that of the ground R_g. It is known that the resistance of the voltmeter is $R_v = 10{,}000$ ohms. Assume that the resistance of the ground $R_g = 10{,}000$ ohms. By applying Ohm's law $E = I\ (R_v + R_g)$, or $120 = IR_v + IR_g$. Since IR_v is equal to IR_g the voltage drop across each is 60 volts and hence the voltmeter reads just 60 volts. If the voltage of the circuit to be measured is known, then the reading of the voltmeter gives a good indication of the current carrying capacity of the ground. Consequently, as the reading of the voltmeter approaches the voltage of the circuit, it can be assumed that the resistance of the ground is becoming less and less. The ground becomes dangerous as its resistance decreases.

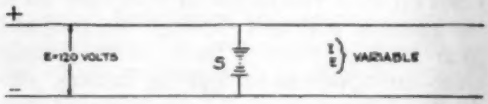


FIG. 6

In Fig. 6 is represented a condition where both the positive and negative conductors are grounded. The effect of such a circuit is analogous to the circuits represented in Figs. 1, 2, and 3. If the total resistance is high then the circuit is comparable to the voltmeter circuit. If the resistance is small, as in the case of the electric iron, the circuit will rob the battery of energy. If the resistance is low then the short circuit condition is approached.

To better visualize conditions that exist on board a submarine, Fig. 7 represents one cell connected to the hard rubber ventilation duct. Sulphuric acid has been deposited in this duct so that there is a continuous film path from one terminal to the lead-lined box into which this duct leads. The acid ground is shown by a dotted line. If the voltmeter has one lead connected to the opposite terminal and the second lead connected to the ground, a reading will be obtained from the voltmeter. The voltage reading will indicate the capacity of the acid path to conduct current. As the amount of acid in this path increases, the capacity of the path to carry current will also increase.

Assume that the voltmeter and the acid path each have a resistance of 10,000 ohms. It can be seen that the same condition exists as the one previously described in Fig. 5 because the two resistances are in series. Hence, since the total voltage of a single cell is approximately 2 volts, the voltmeter will read 1 volt. But if the cell is being

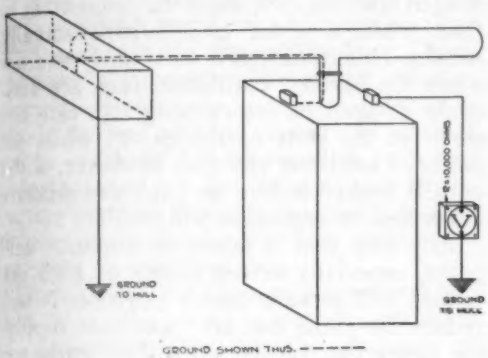


FIG. 7

charged, electrolyte spray may be deposited heavily along the ground path. A better ground path will be formed with the result that the total resistance of the path will decrease. For example, if the resistance of the ground path drops to 2,000 ohms, the voltmeter will read

$$\frac{10{,}000}{10{,}000+2{,}000}\times 2 = 1.67 \text{ volts}$$

To illustrate an actual condition that exists in any group of cells that are ventilating into a common hard rubber duct and are connected in series, it will be found that the following electrolyte paths exist at some time during the process of charging. The dotted lines shown on Fig. 8 illustrate five types of circuits that have been proven to exist on submarines of the O-class and S-class. The same circuits can exist on vessels of the V-class as the ventilating principles employed are substantially the same as on the above mentioned submarines. Of these circuits certain ones are grounds. The others are short circuits that actually reduce the efficiency of the battery.

Ground No. I is formed by an acid path from one terminal of a cell out through the acid covered nipple and along the hard rubber ventilation duct to the lead-lined box where a connection to the hull is made. If there is a ground of the opposite polarity on this box, the circuit will be completed and form a short circuit. This is a dangerous type of ground since a large voltage drop is distributed over a short length so that the heating effect of the circuit current is localized. This ground will indicate on the ground detector. This type of ground is probably responsible for changing ground detector readings during charging.

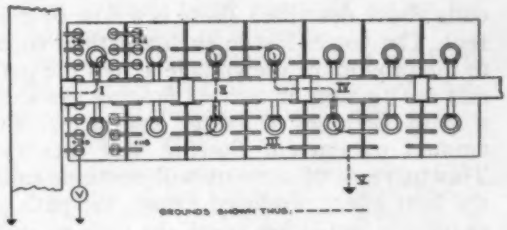


FIG. 8

Short circuit No. II is formed by an acid path from a terminal of one cell up through a gooseneck and nipple out to the hard rubber vent duct and then down the nipple and gooseneck to a cell of lower voltage than itself. This is a particularly dangerous type of short circuit in that it is possible to have a large voltage drop over a short path. If such a path should be ruptured there would be a violent arcing as the result. This type of short circuit does not indicate on the ship's ground detector. The personnel responsible for charging a battery have no means of determining the existence of such a short circuit.

Short circuit No. III is formed by an acid path connecting the two terminals of a single cell along the inside or outside of the hard rubber cell cover. This short circuit does not indicate on the ship's ground detector but, since it can never be greater than the voltage of a single cell, it is not dangerous.

Short circuit No. IV is identical with short circuit No. II. It is shown, however, to indicate that the acid path may travel down the gooseneck and nipple of any cell of lower voltage and form a short circuit. Obviously a number of these short circuits will materally reduce the efficiency of a battery. This type of short circuit will not indicate on the ship's ground detector.

Ground No. V is formed by an acid path from one terminal over the top of the cell and down the outside of the battery jar to the side of the ship. If such a path is broken any sparking that might occur will be out-

side of the ventilation duct. Such a ground taken alone is not usually dangerous. This type of ground will show on the ship's ground detector. It, however, may serve to complete the path of ground No. I which would result in these two grounds combining to form a short circuit.

The resistance of any of the above five circuits is variable and dependent upon the amount of acid in the path. In the short circuits above described, there is a flow of current. The power lost in such a path is equal to the product of the voltage across the path and the amount of current flowing. As such a path becomes a better conductor, the amount of current flowing will increase. This increase of current will continue until the heat effect produced causes the path to evaporate and either break the path entirely or increase the resistance of a section of the path so much that very little current will flow. Thus, it is obvious that the efficiency of the battery is lowered by the energy lost through short circuits in the ventilation system.

From the foregoing it is apparent that the operator is by no means aware of the many dangerous short circuits that exist when a free deposit of sulphuric acid is present in the ventilation ducts of a submarine storage battery. Not only do these short circuits cause a reduced efficiency in the battery but they also introduce the possibility of an explosion. None of the circuits alone will cause an explosion. An explosive mixture of hydrogen and oxygen must be present at a time when a short circuit path actually breaks. This condition is most likely to exist when the battery ventilation fans are suddenly stopped or are running at a rate too slow for the state of the charge while the batteries are being charged. However, if the path is broken before an explosive mixture is formed, no explosion will result.

Any step that is taken to eliminate acid paths, especially across points of high potential, will serve a double purpose. It will reduce the paths that are capable of supplying dangerous sparks, when these paths are broken, and by the elimination of these paths will increase the efficiency of the battery.

THE HANKOW INCIDENT

By Captain Elbridge Colby, U. S. Army

EARLY in the month of January, 1930, a British naval officer driving an automobile in the city of Hankow, China, ran over a Chinese coolie riding either a motor cycle or a bicycle, reports differ as to which. Anyone who has ever driven an automobile in China will be ready to state that Chinese bicyclists are erratic and nerve-racking pests on the public highway, but the incident jumped into startling prominence for other reasons than this.

During 1929, the Chinese government had been asking the treaty powers for abolition of extraterritoriality, for the recession of the jurisdiction over treaty-power nationals from the consular courts. This in spite of the plain position of the British government in the Shanghai treaty of 1902, at the Washington conference in 1921, and at Peking in 1926, that Britain was not yet ready to relinquish her treaty rights. On December 28, 1929, the Chinese government issued a "mandate" declaring extraterritoriality abolished; but this action was unilateral and has not been agreed to by the treaty powers concerned.

The Hankow incident has been looked upon as a first test of the effectiveness of the Chinese government's declaration. In response to a prompt demand by the British consul, the British naval officer, who had been detained, was expeditiously released. There has been an inclination to look upon this result as definite proof that the Chinese "mandate" was a mere face-saving pronouncement and that there has actually been no abolition at all.

It is not inappropriate to consider if this is actually the case. Indeed, it appears that members of military or naval forces stationed in China cannot furnish any true test at all. Some of these troops and naval personnel, from Peking to the sea, are in China in conformity with the International Protocol of 1901. To this protocol, China agreed. Others have been there many years, in many treaty ports and on navigable rivers far inland, and it must be assumed that Chinese consent to their being stationed within her boundaries is tacit or implied.

Thus we arrive at the situation set forth in the famous case of the *Schooner "Exchange"* v. *McFaddon* when Chief Justice John Marshall said:

> A public armed ship constitutes a part of the military force of her nation; acts under the immediate and direct command of her sovereign; is employed by him in national objects. He has many and powerful motives for preventing those objects from being defeated by the interference of a foreign state. Such interference cannot take place without affecting his power and his dignity. The implied license therefore under which such vessel enters a friendly port, may reasonably be construed, and, it seems to the court, ought to be construed, as containing an exemption from the jurisdiction of the sovereign within whose territory she claims the rites of hospitality. "It is impossible to conceive," says Vattel, "that a prince who sends an ambassador or any other minister can have any intention of subjecting him to the authority of a foreign power." Equally impossible is it to conceive, whatever may be the construction as to private ships, that a prince who stipulates a passage for his troops, or an asylum for his ships of war in distress, should mean to subject his Army or his Navy to the jurisdiction of a foreign sovereign.

What then of the foreign troops stationed at Tientsin, or the legation guards in Peking? "It is well settled," said the Supreme Court, "that a foreign army permitted to march through a friendly country or to be stationed in it, by permission of its government or sovereign, is exempt from the civil and criminal jurisdiction of the place." This line of thought, initiated by John Marshall, quoted with approval in the Coleman case, in *Dow* v. *Johnson,* and in *Tucker* v. *Alexandroff,* is not, however, absolutely clear to the point at issue. *Coleman* v. *Tennessee* turned upon the law of belligerent occupation, and so did *Dow* v. *Johnson. Tucker* v. *Alexandroff* depended upon an existing and effective treaty, and interesting as is its summary of foreign troops permitted to enter the United States as organized units, it is of little help save as *dictum,* for it very

clearly states: "In none of these cases did a question arise as to the immunity of foreign troops from the territorial jurisdiction." Indeed, *"Exchange"* v. *McFaddon* was also something quite different, for all that Marshall really decided was that a foreign man-of-war could not be libeled for possession in a friendly country; the question concerned solely the property of a friendly sovereign, not the personnel under his control.

The general idea that an armed force represents its sovereign and should not be interfered with by officials of a friendly country in which its temporary presence is permitted by consent explicit or implied, seems at first thought to be sound. There appears to be some analogy between such a possible immunity and the immunity enjoyed by ambassadors, ministers, their secretaries, retinues, and servants—both being considered inviolate agents of a foreign sovereign.

Let us see if such an immunity, entirely aside from the question of extraterritoriality, exists in American conceptions of international law. What will be our conception if an American military or naval officer finds himself in the same predicament as that in which the British officer found himself in January. We shall find little or nothing on the subject, even though an almost pertinent case arose at the time of the Boxer rebellion. In 1900 a trooper of the 6th Cavalry, ordered to Peking to protect the legations and help suppress an armed uprising against foreigners, shot and killed a fellow-trooper. He was court-martialed, convicted, and sent home to Leavenworth for life imprisonment in the penitentiary—all under the 58th Article of War giving courts-martial jurisdiction over murder cases among military personnel "in time of war, insurrection, or rebellion." It was assumed that "insurrection or rebellion" in the article referred to uprisings against the home authorities in the United States, and so recognized by presidential proclamation. There was actually no "war" declared "against either the government of China or the Boxer element of that government." The offending soldier had been tried in accordance with the personal jurisdiction of military law. There was apparently no thought of turning him over to unfriendly Chinese tribunals for trial. When his case was taken into our federal courts, he was actually in the United States. It was a delicate question. Should the military be permitted to do their own house cleaning, or should a convicted murderer be let loose on a writ of habeas corpus? The court refused to be bound by the idea that the political department of the government declares war or not and the courts are bound by such declaration or non-declaration. It turned rather to Justice Grier's method in the *Prize Cases* and decided that "there prevailed in China a condition of war within the spirit and intent of the 58th Article of War."

It is not for us to say how far the court was influenced by the circumstances of the case. It was stated that among our troops in a foreign country to protect our citizens, there must be power to enforce soldierly discipline and ordinary order, and to protect those of our citizens who make up the rank and file of those troops. Hence this case is not analogous to the British naval officer at Hankow.

In Cuba, during the military occupation following the Spanish-American War, there occurred another case of a somewhat similar nature. An artillery soldier of the United States killed (allegedly in self-defense) a "desperate character" and the Secretary of War asked if trial by court-martial could be had under the 58th Article of War, or if trial must be by the civil courts of Cuba. The "desperate character" was a teamster in the military service and the killing took place on premises occupied by United States troops. The Attorney General advised, that there was no "state of war" in Cuba, since the treaty of peace with Spain had been signed, and we were not at war with Cuba, and therefore the court-martial could not try the soldier for murder. Cuba, he said, might waive the right to try the offender.

The supposed exemption of the Army, even if it were granted by Cuba, would be granted to the United States as a nation for our national purposes. It would carry with it no individual right of Private York. Accordingly the United States would be free to waive it or insist upon it without consulting Private York. And in this the President would represent them.

Now it happens that the occupation of Cuba by our forces was not belligerent occupation, like those in the *Coleman* and *Dow* cases, but a friendly one. It is true that Cuba was a separate nation. But it also happened that, pending the establishment of Cuban sovereignty in accordance with the

self-denying ordinance, "the President [was] exercising the governmental powers of the people of Cuba" and would not foolishly grant or demand exemptions to or from himself. There was no question of national dignity involved or of interference. Indeed, said the Attorney General, "we cannot presume in the case of bodies of troops stationed in Cuba for the purposes for which ours [were] there, that to try a soldier for murder will defeat the object of the presence of the troops. If there is to be any presumption, such a trial would rather tend to further that object."

A demand that a soldier be turned over to civilians for trial for capital offense must, in ordinary circumstances in the United States, be instantly complied with by military commanders, under the 59th Article of War. This is in accord with ancient British and American practice which regarded soldiers as not exempt from civil processes or jurisdiction, a practice maintained in order to prevent local misbehavior by home troops among civilian populations. But of course, such a demand could not properly be made in distant Cuba, for the intent of the 59th article was to protect the home localities against soldierly oppressions and depradations, and that only. The Attorney General therefore considered that the soldier was not required to be delivered to the Cuban courts, but it was nevertheless proper to permit such courts to try him. And we readily realize that in 1900 if he were not tried by Cuban courts, he would not be tried at all. It is also interesting to note that the opinion made much of, and possibly took for precedent, the British practice of permitting British soldiers to be tried in newly occupied territories by civil courts under British control just as the Cuban courts were under American control at the time of occupation.

Although these cases of Private Hamilton and Private York are not exactly to the point, they at least throw light on the subject. In the one case, the civil courts were under American and in the other under foreign control. And the Hamilton opinion quoted *Coleman* v. *Tennessee* to say that "there would be something incongruous and absurd in permitting an officer or soldier of an invading army to be tried by his enemy, whose country he had invaded." It also made material the fact that the United States was in China in 1900 "prosecuting its rights by force of arms."

However, extraterritoriality aside, it is now perfectly proper for military and naval offenders against civil, as distinct from military, laws, to be tried by courts-martial in foreign countries.

In China today there is antiforeign agitation, including agitation for the withdrawal of foreign troops. There is diplomatic argument upon the subject. But the troops are still there. And they are there in exactly the same status as they were in 1900, protecting citizens and property "by force of arms" even though no hostilities have ensued, protecting by their ever-present threat of force though without actual use of force. It is constructive force by which they accomplish their object.

They are present in China as parts of an armed organization maintained at its allotted strength, stationed at determined places, and assigned specific duties, in accordance with the will of the foreign governments which they represent.

The British publicist, W. E. Hall, writes:

> There can be no question that the concession of jurisdiction over passing troops to the local authorities would be extremely inconvenient; and it is believed that the commanders, not only of forces in transit through a friendly country, but also of forces stationed there, assert exclusive jurisdiction in principle in respect of offenses committed by persons under their command, though they may be willing as a matter of concession to hand over culprits to the civil power when they have confidence in the courts, and when their stay is likely to be long enough to allow of the case being watched. The existence of a double jurisdiction in a foreign country being scarcely compatible with the discipline of an army, it is evident that there would be some difficulty in carrying out any other arrangement.

There is a valid principle, and one in conformity with the usual military mind, desirous of doing its own house cleaning and of protecting itself from civil interference. It is even valid in its suggestion that offenders might be tried in local courts when the military "have confidence in the courts."

Hall also says:

> The immunities of a vessel of war belong to her as a complete instrument, made up of vessel and crew, and intended to be used by the state for specific purposes; the elements of which she is composed are not capable of separate use for those purposes; they consequently are not exempted from the local jurisdiction. If a ship of war is abandoned by her crew she is merely property;

if members of her crew go outside the ship or her tenders or boats they are liable in every respect to the territorial jurisdiction. Even the captain is not considered to be individually exempt in respect of acts not done in his capacity of agent of his state. Possessing his ship, in which he is not only protected, but in which he has entire freedom of movement, he lies under no necessity of exposing himself to the exercise of the jurisdiction of the country, and if he does so voluntarily, he may fairly be expected to take the consequences of his act.

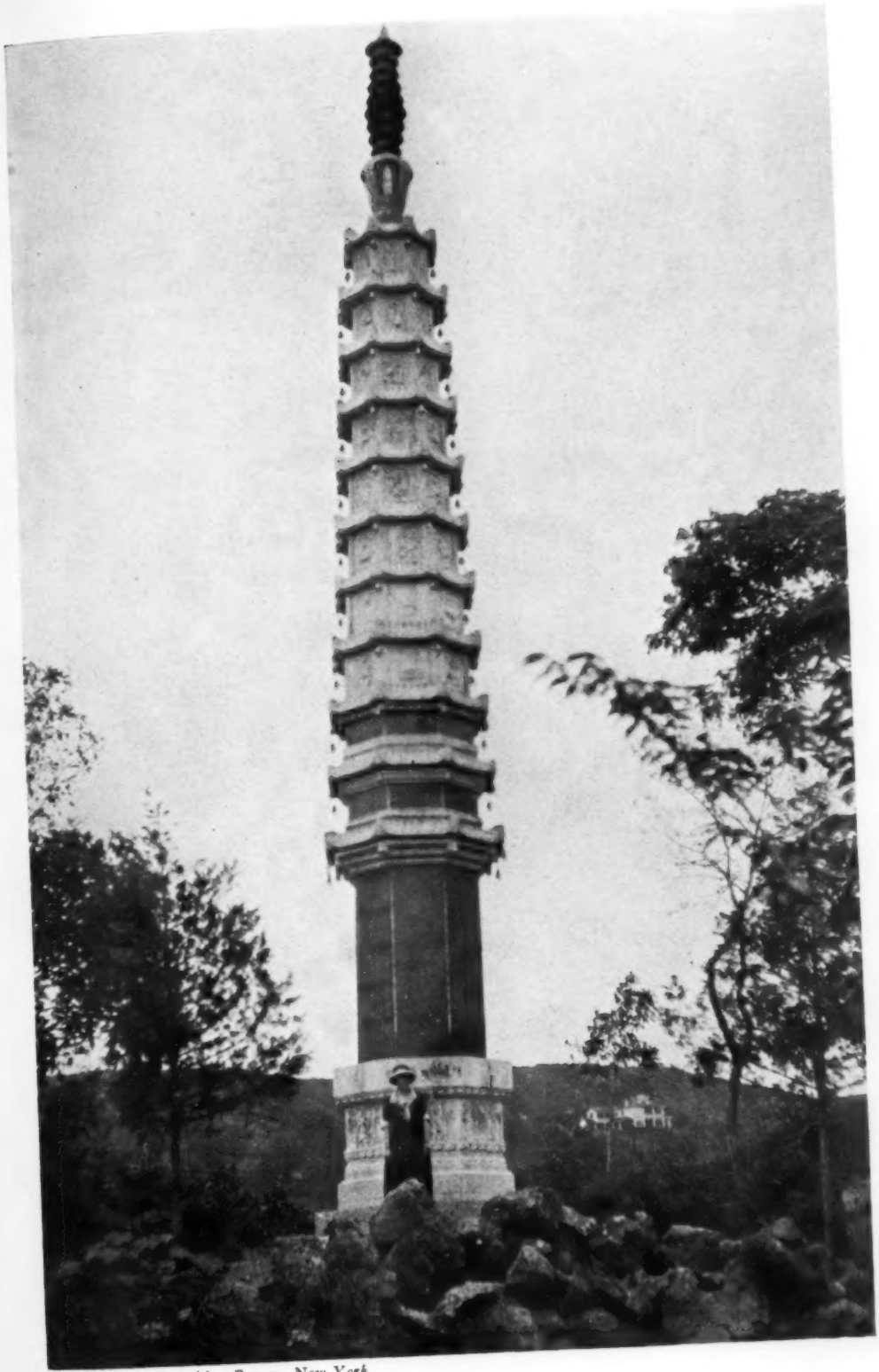
This contention of Hall is paralleled by a pronouncement by Secretary of State Randolph in 1794, when he said:

The officers of a vessel of war belonging to a foreign nation cannot set up extraterritoriality when unofficially on shore in a port in whose harbor their vessel is temporarily moored.

If our British naval officer in Hankow were driving his own automobile for pleasure, it would therefore be something different from his driving an official automobile on official business. And how shall we look at the foreign garrisons, the British at Tientsin or Shanghai? Some of the officers and soldiers live outside of the compounds where the troops are barracked. If they are on their way to roll call or drill formations, they are "on duty;" but if they are merely progressing towards a country club or towards a motion picture theater, are they not "off duty" and "unofficially" and therefore in the same status as other alien residents in those cities?

It is to be doubted if we can make such a distinction. The essential point is that the individual is a member of armed forces stationed at a certain place for duty—not at all to be always on duty, but at least to be always available for duty. They are not in any different status from that of a lonely lighthouse keeper. He has his hours for sleep, those for eating, possibly even hours for recreation. But he is always at his post of duty. Just so is the soldier, ordered to and held at a distant over-seas garrison, not to be always fighting, but to be at hand and prepared if fighting should be necessary. Interference with his liberty by local tribunals of the foreign country where he is stationed with implied or explicit consent, is interference with the objects and methods of the sovereign state which he serves.

In the second volume of Moore's *Digest of International Law*, there will be noted a number of instances where sailors from foreign men-of-war get into trouble ashore, and the general impression gained from reading that section is that, although there is nothing strictly provided to cover such cases in international law itself, yet the practice has been such as to indicate an exemption from local jurisdiction. It is entirely possible to assume that the practice has been due to friendliness and to comity, that the surrender of offenders for trial by their own military tribunals has been a gracious courtesy practiced towards official armed units of other countries. Perhaps it is also possible to trace a gradual settling of this practice into custom and, as Dr. Moore has said with regard to the question of non-confiscation of enemy property, to say that "the modern usage of nations" has "become law."



Courtesy Navy Recruiting Bureau, New York

NEEDLE PAGODA, HANGCHOW, CHINA

Courtesy Navy Recruiting Bureau, New York

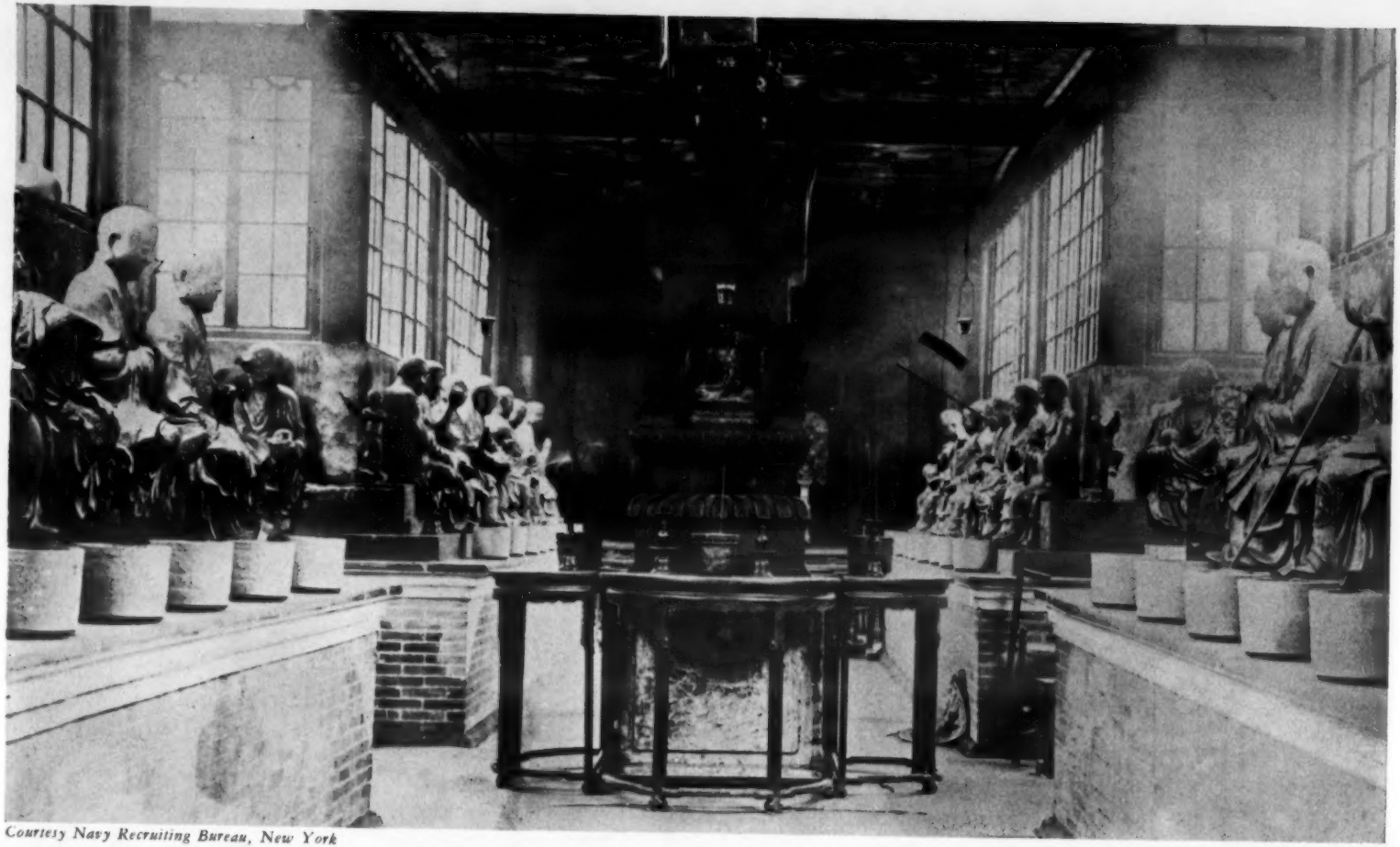
NATIVE CRAFT MOORED TO DOCKS AT SHANGHAI, CHINA

Courtesy Navy Recruiting Bureau, New York

NATIVE CRAFT MOORED TO DOCKS AT SHANGHAI, CHINA

From Ewing Galloway, New York

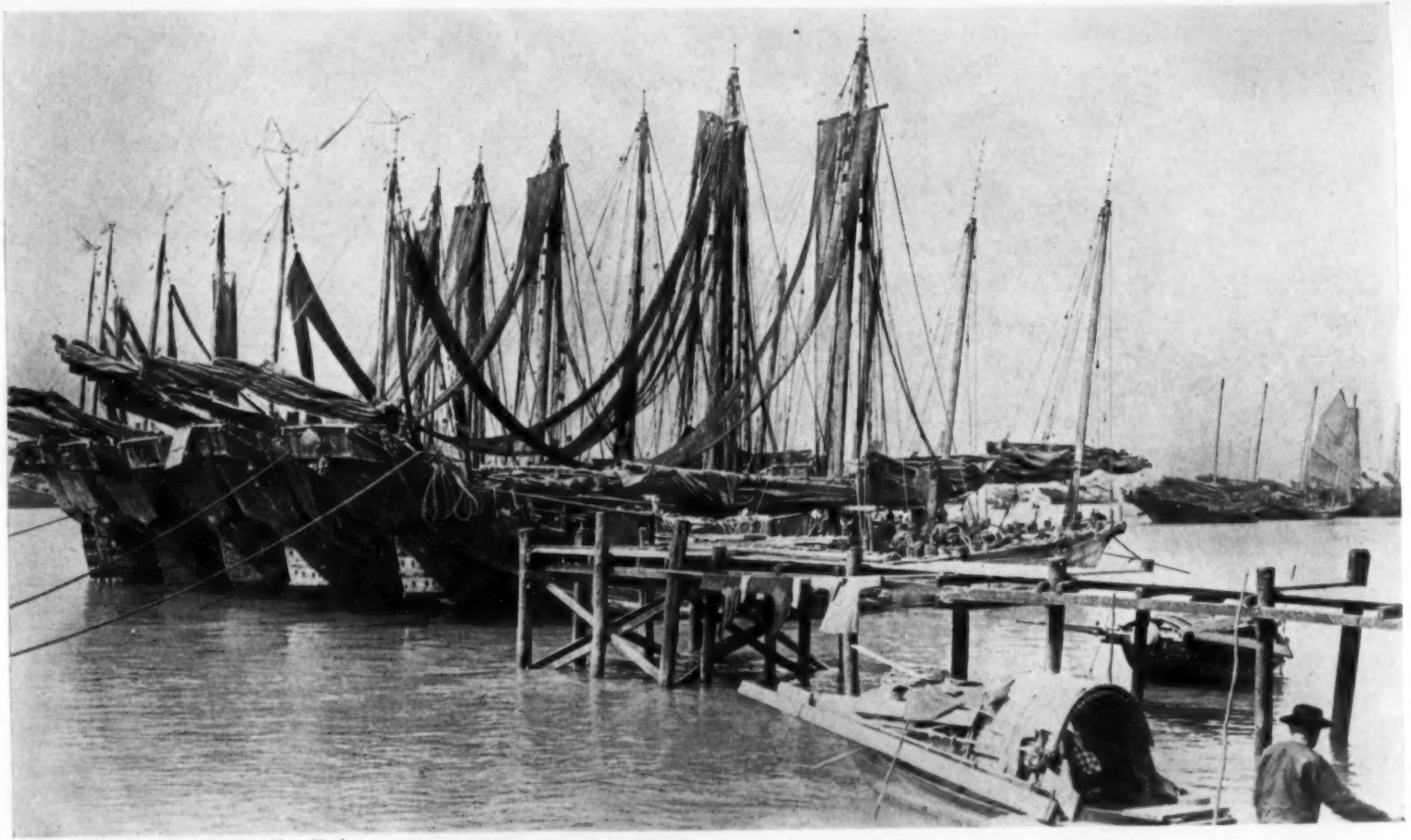
VIEW OF KIUKIANG ROAD, SHANGHAI, WITH U. S. BLUEJACKETS MARCHING DOWN THE ROAD



Courtesy Navy Recruiting Bureau, New York

INSIDE THE TEMPLE OF FIVE HUNDRED GODS, CANTON, CHINA

INSIDE THE TEMPLE OF FIVE HUNDRED GODS, CANTON, CHINA



Courtesy Navy Recruiting Bureau, New York

FISHING JUNKS DRYING THEIR NETS NEAR SHANGHAI

Courtesy Navy Recruiting Bureau, New York

CHINESE JUNK PASSING THE U.S.S. *MEMPHIS* AND *MILWAUKEE* ANCHORED OFF HONKONG

CHINESE JUNK PASSING THE U.S.S. *MEMPHIS* AND *MILWAUKEE* ANCHORED OFF HONKONG

International Newsreel

ON THE UPPER YANGTZE RIVER

Herbert Photos, Inc., New York

MARCHING THROUGH A CHINESE STREET

BRINGING ASTRONOMY TO THE SERVICE OF AËRIAL NAVIGATION

By G. W. Littlehales

THE literature of air navigation is pervaded with aspiration to bring astronomy to the support of navigation above the clouds and over the sea. While the fundamental principles must be the same as those which have supported navigation on the sea, their application in aërial navigation ought to provide the solution of the astronomical observations for position without the necessity of antecedent knowledge of the approximate geographical position of the observer, and in restricted room with few appliances, to attain a celerity of execution in consistency with the speed of aëroplane flight.

Instances are recorded in which the means supplied to navigators generally by the Hydrographic Office have served to guide transoceanic voyages by astronomical observations in large aëroplanes affording room in which a navigator could devote his attention to astronomical observation. This was successfully done by the use of *H.O. No. 203*, entitled "The Sumner Line of Position Furnished Ready to Lay Down upon the Chart by Means of Tables of the Simultaneous Hour Angle and Azimuth of Celestial Bodies," in the flight of the late Commander John Rodgers from California to the Hawaiian Islands, and, more recently, in the flight of the *Southern Cross* over the Pacific Ocean from California to Australia.

Nevertheless, aside from exceptional occasions in which the restrictions usually limiting performance have been relieved, the means available for finding geographical position from astronomical observations seem scarcely to be within the capacity of the aviator. Admiral Gago Coutinho sought and found the avenue to successful performance, during his flight from Portugal to Brazil, in the configuration of the heavens of the tropics. Observing altitudes of celestial bodies of low declination while crossing the ocean in low latitudes, gave the sides of the astronomical triangle representing the polar distances of the zenith and the polar distance of the observed celestial body nearly equal lengths approaching 90° and hence the included angle between them, the hour angle, would have nearly the same arc measure as the zenith distance or complement of the altitude, as will appear from the following equation expressing the trigonometrical relationship in the astronomical triangle, of the latitude *(L)*, declination *(d)*, hour angle *(t)*, and zenith distance *(z)*:

$$\cos z = \sin L \sin d + \cos L \cos d \cos t$$

In this expression, when L and d are small, $\sin L \sin d$ will become negligibly small; and $\cos L \cos d$ will be nearly unity. So that $\cos z = \cos t$ (nearly), and hence $z = t$ (nearly). And, moreover, since in these circumstances, the observed body will have an azimuth not far from 90°, a change in zenith distance will effect a change of hour angle of approximately the same arc measure, as shown by the differential equation $dz = \cos L. \sin Z.dt.$

In an analogous way, by recognizing the special conditions described in the Proceedings for the month of August, 1925, in an article entitled "Finding Geographical Position in the Region of the North Pole," Admiral Byrd conducted successful observations in his aëroplane flights to the North Pole and the South Pole. To an observer at either pole, the zenith coincides with the corresponding pole of the heavens, and hence parallels of altitude coincide with parallels of declination and vertical or azimuth circles with hour circles and meridians of longitude. The values of the declination of the sun, moon, planets, and stars, registered in the *Nautical Almanac* are, therefore, for the specified times, the values of the altitude that these celestial bodies would have with reference to the horizon of an observer at the pole, and likewise, the specified times indicate the azimuthal direc-

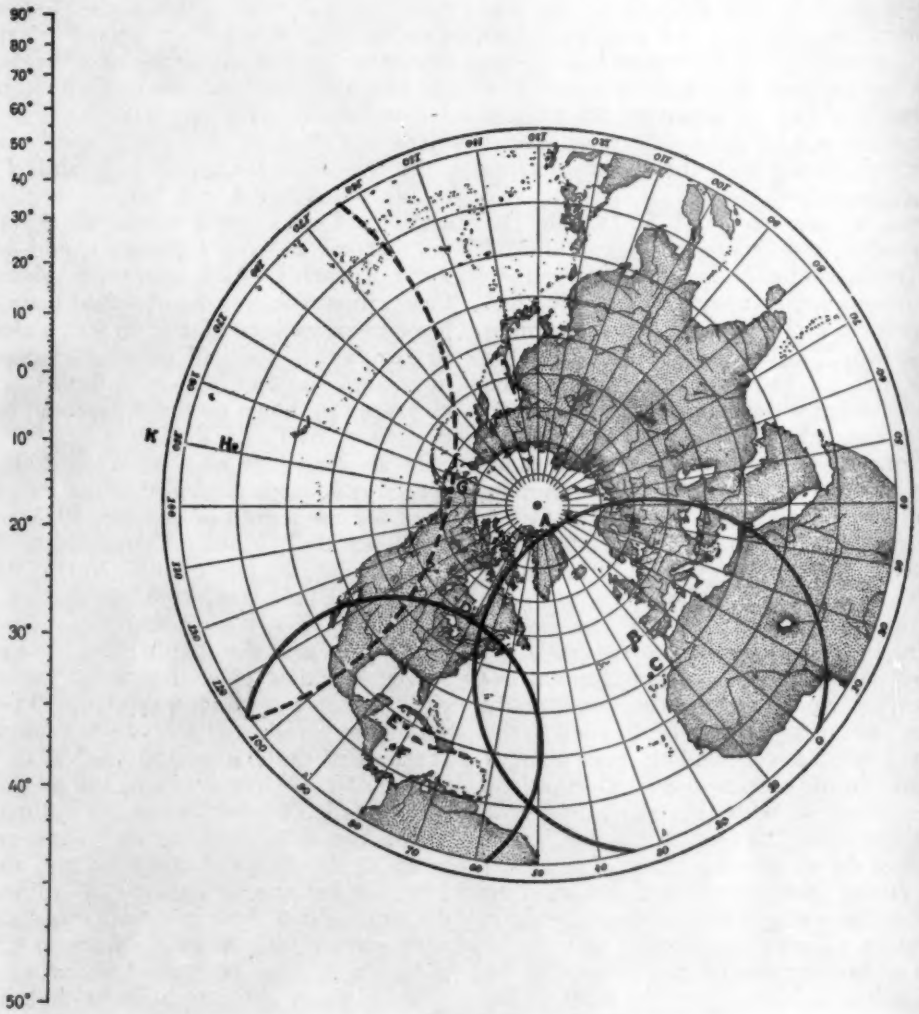
tion of the celestial body with reference to the prime meridian.

In this configuration, as well as in the foregoing instance, the evidence of these equivalences by visualization is readily confirmed by analytical considerations. Putting for cos z, its other form, sin h, the expression previously employed becomes: $\sin h = \sin d \sin L + \cos d \cos L \cos t$. At the pole, the latitude is 90°, and hence $\sin L = 1$, and $\cos L = 0$, which values require the expression to assume the form $\sin h = \sin d$, and hence $h = d$. And, from the proportionality between the sines of the sides of a spherical triangle and the sines of their opposite angles, the relation which is ordinarily written

$$\frac{\sin t}{\sin Z} = \frac{\cos h}{\cos d}$$

becomes at the pole, since $h = d$ in that location, $\frac{\sin t}{\sin Z} = 1$ or $\sin t = \sin Z$, and hence $t = Z$.

The *Nautical Almanac* is, therefore, to be regarded as a complete altitude and azimuth table at the poles of the earth, and, consequently, a rapid course of procedure presents itself for finding the Sumner line of an observer in a geographical position as yet unknown, since the observer, having by measurement ascertained the altitude of a celestial body at a given instant by a timepiece keeping the mean time or the sidereal



time of the prime meridian, may at once compare this altitude with the declination of the observed celestial body as registered in the *Nautical Almanac* for the specified time. The difference between the altitude obtained by measurement and the altitude in which the observed celestial body would be at the same instant if the observer were situated at the pole is equal to the interval in latitude between the pole and the Sumner point on the meridian of longitude passing through the "geographical position" of the observed celestial body at the instant of observation, that is, the meridian whose longitude is indicated, in the case of the sun, by the Greenwich mean time with the equation of time applied, or, in the case of a sidereal body, by the Greenwich sidereal time with the observed body's right ascension applied.

A convenient procedure thus becomes available for delineating the Sumner line, applicable alike to all parts of the world and free of the requirement of any antecedent knowledge of the geographical position of the observer. The accompanying illustrative chart of the Northern Hemisphere is on the equatorial stereographic projection, and accordingly, all Sumner circles, excepting those passing through the pole of vision (which appear as straight lines), are projected as circles. This is an important feature, for no other lines can be more accurately and quickly drawn than circular circumferences. Besides the "geographical position" of the observed celestial body, which is always in a latitude equal to the declination of the body and in a longitude equal to the Greenwich hour angle of the body, the requisite additional information, for delineating an arc of the circumference of the Sumner circle to represent the position line of the observer, is supplied by the Sumner point, whose colatitude on the meridian of the observed celestial body is found by comparing the altitude of the celestial body, as obtained from measurement, with the altitude that the body would have if observed at the pole, as indicated by the declination.

Since the scale of latitude along the meridians of the illustrative chart is an expanding scale as shown in the illustration, the center from which the Sumner circle is described is generally offset from the "geographical position" of the observed celestial body by an amount equal to one-half of the excess of the length of the zenith distance of the observed celestial body measured opposite to the direction of the pole from the "geographical position" of the body along the meridian scale as compared with the same zenith distance represented in the length between the "geographical position" of the body and the Sumner point. Because of the reduced scale of the illustrative chart and the consequent omission of the subdividing marks of the projection, a scale of the subdivisions of latitude along a meridian is placed to one side, in order to make it practicable to follow the prescribed procedure of laying off the zenith distance both to the north and the south of the declination or latitude of the geographical position of the observed celestial body, in finding the offsets of the centers of the Sumner circles which are delineated upon the chart to represent the solutions of the examples page 942.

It is often sufficient to describe an arc of the circumference of a single Sumner circle, as when a general geographical feature is encountered, such as a coast line of which the part presented to view must be identified. Of this an example is given on page 942.

The three Sumner circles or circles of equal altitude are shown upon the illustrative chart, as far as they lie within its limits. Those resulting from the observations of Vega and Arcturus in the first two examples, being simultaneous, are delineated in the same symbol, and by their intersections show the location of the observer to be either in the seaward approaches to the Orinoco River or else on the eastern mainland of Canada. The Sumner circle from the observation of the sun, in the third example, delineated in a line of dashes, indicates the coast line which was seen by the observer at the time of the observation to be the Mexican coast in the vicinity of Acapulco. With reference to each of the three observations in the illustrative examples, there are designated the Sumner point, the geographical position of the observed celestial body, and the offset pivot point from which the radius arm of the Sumner circle is swept. In relation to Vega, these points are marked, A, B, and C, respectively; to Arcturus, D, E, and F; and to the sun, G, H, and K.

Since the quality possessed by the stereographic chart of affording an easy and

natural delineation of the locus of geographical position of the observer, known as the Sumner circle, has been made an element in the procedure set forth, it will be germane to mention other advantageous qualities which inhere in this form of projection. Angles are preserved, and the stereographic is the only true projection which possesses this important feature, although by methods of development, of which the Mercator chart is an example, the preservation of angles is also accomplished. Angles may, accordingly, be measured and courses laid down upon the stereographic chart. A given distance is represented by varying lengths on different parts of the chart. Despite this, however, distances may be measured with facility and accuracy, provided use is made of the stereographic scale, which is merely an embodiment of the arcs of a system of great circles and small circles corresponding to the meridians and parallels of half

Example. On May 31, 1931, the true altitude by observation of Vega was 47° 55′ at 19ʰ38ᵐ34ˢ by a watch regulated to Greenwich sidereal time. Required the Sumner circle of position.

Vega				
G.S.T.	19ʰ38ᵐ34ˢ	Alt. at pole (Dec. from *Nautical Almanac*)	38° 42′.9 N.	
R.A.	18 34 38.0			
G.H.A. =	1 03 56 W.	True alt. from measurement	47 55	(Zenith distance 42° 05′)
=	15° 59′ W.	Polar distance of Sumner point	9 12.1	

(To be laid off along the meridian 15° 59′ W. of Greenwich, toward the direction of the observed body since the true altitude is greater than the altitude at the pole).

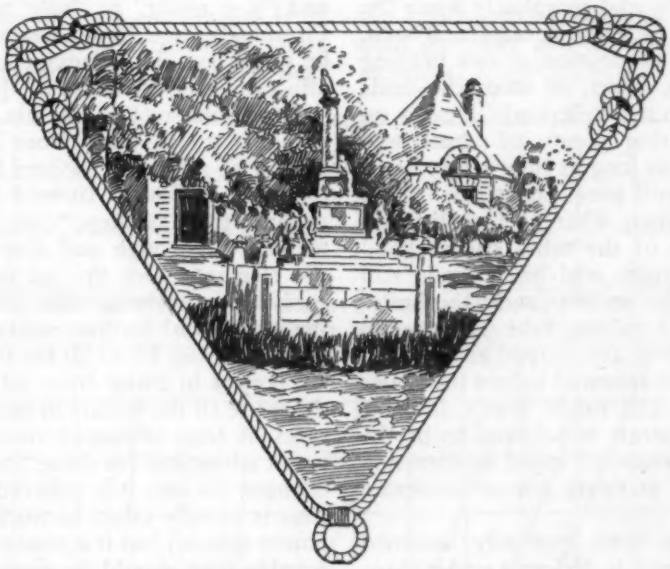
Example: Immediately after the observation stated in the foregoing example, the corrected altitude of Arcturus was found from sextant observation to be 59° 40′. Required the Sumner circle of position and the geographical position of the observer.

G.S.T.	19ʰ38ᵐ34ˢ	Alt. at pole (Dec. from *Nautical Almanac*)	19°32′.3 N.	
R.A.	14 12 32.9			
G.H.A. =	5 26 01.1 W.			
=	81° 30′.3 W.	True alt. from measurement	59 40	(Zenith distance 30° 20′)
		Polar dist. of Sumner point	40° 07′.7	

Example: Within sight along a coast line, on April 11, 1931, by sextant observation the true altitude of the sun's center, bearing westward, was deduced to be 35° 50′ at 22ʰ01ᵐ18ˢ by a watch regulated to Greenwich civil time. Required the geographical position of the observer.

G.C.T.	22ʰ01ᵐ18ˢ	Dec.	8° 02′ N.	(Zenith distance 54° 10′)
Eq.T.	—1 18	True alt.	35 50	
G.A.C.T.	22 00 00 from midnight	Polar distance of Sumner point	27 48	
G.A.T.	10 00 00 from noon			
G.H.A.	150° W.			

a hemisphere stereographically projected upon the plane of the meridian. The lines may be printed or engraved upon transparent material such as celluloid, which is almost ideal for the purpose. Plotting by latitude and longitude is rendered convenient by subdividing the intermediate meridians of longitude and parallels of latitude between those represented by continuous lines upon the chart, in the manner shown in the great circle sailing charts of the Hydrographic Office.



THE STRAW THAT BREAKS THE CAMEL'S BACK

By Lieutenant Commander V. H. Godfrey, U. S. Navy

THERE is a remarkable similarity between camels, the motive power of the desert, and boilers, the motive power of the ocean, at least as far as the light cruisers are concerned. And the story told of the camel—how he faithfully bears his load, uncomplaining as long as he is given food and occasional water, only to crumple absolutely and completely when the last straw is laid on his over-burdened back, when physical examination shows nothing wrong with legs, heart, or stomach—finds its counterpart in the boilers which carry on cheerfully, enduring plenty of abuse and rough treatment as long as they are fed fuel oil and water, until some last straw causes a general breakdown. Then an investigation shows the metal of the tubes still in good condition, the drums and brick walls still durable and fit for service; only the boiler has sprung leaks galore, tube sheets, and the tubes themselves are warped and twisted until they must be renewed before the boiler can be cleaned and made ready for use again. And this straw is believed to be the result of many years of rapid acceleration and deceleration at fairly low or moderate speeds.

It has always been generally assumed that in going from 5 to 15 knots under three boilers or from 20 to 25 under six boilers that little or no care need be taken. The officer of the deck may ring up "full speed" as nonchalantly as he would step on the accelerator of an automobile making about 20 miles and get the same almost instantaneous response. Down below the water tender on watch may curse vehemently as he rushes on all burners, speeds his blowers to their maximum, and opens full wide the fuel-oil heater. The officer of the watch in the engine-room may groan as he sees his "score" for the watch ruined. He helplessly resents the imperative "stop smoking" signal from the bridge, but no one pauses to think or realize that all of a sudden, without any preparation, a full-power-run performance has been demanded of the boilers in use. And finally after years of this, the boiler just gets tired. Some little additional demand for steam during this critical speeding-up period upsets its equilibrium—the tubes warp or pull loose from the drums and "low water" or "split tube" is blamed for the damage found when the boiler can be examined. This damage is, however, the effect and not the cause of the failure.

No engineer officer in his right senses is going to try to jump from 20 or 25 knots even with all twelve boilers lit off, right up to 31 or 32 knots. Instead he takes hours to make that last step, "cooking" the boilers to insure thorough and slow heating of all the elements. Yet the increase of load *on each boiler* in doing this is no greater than the increase of load on each of three boilers in going from 15 to 20 knots or on each of six boilers in going from 20 to 25 knots, if those are all the boilers in use in the last two cases. A time allowance running into hours is not advocated for these "moderate speed" changes (in fact it is believed that too much time is usually taken in working up to full-power speeds) but it is contended that a reasonable time should be given each boiler in use to adjust itself to changed steaming conditions, regardless of the actual speed of the ship. In other words it is contended that a definite maximum rate for increasing or decreasing the rate of burning fuel oil in a boiler should be prescribed and that that rate should not be exceeded except in emergency.

In Fig. 1 the gallons of fuel oil per hour, per boiler, is plotted against speed in knots for four steaming conditions, viz., with three, six, nine, and twelve boilers in use. Data for these curves were taken from the records of the U.S.S. *Raleigh* and represent actual, clean bottom, best performances

at all speeds. Other types of cruisers may differ as to exact figures, but the form of the curves will be the same.

From a consideration of the curves, it can be readily seen that at 20 knots for three boilers, 25 knots for six boilers, 28 knots for nine boilers and 31 knots for twelve boilers, approximately the same rate of burning oil is encountered per boiler, i.e., around 800 gallons per hour. (Under adverse circumstances, such as foul bottom, these curves shift bodily upward and at those speeds the maximum that can be burned per boiler will be reached, slightly over 1,000 gallons per hour, limited by the blower speed allowed.) These rates per boiler being the same, then it is apparent that the same precautions from the standpoint of boiler welfare should be observed whether the case under consideration is in carrying three boilers from 15 to 20 knots speed, six boilers from 21 to 25, nine boilers from 24 to 28, or twelve boilers from 28 to 31. And these precautions are that the increase in boiler load should be made gradually and steadily, giving the boiler time to adjust itself, and not in a sudden burst when each boiler is forced to the limit until the desired speed is reached.

There is another very vital factor entering into this——the old "force equals mass times acceleration" of our physics days. It actually takes more power, a lot more, while a ship is increasing speed to any desired point than it does to maintain that speed once it is attained. Especially is this true if the propellers are forced to take up the r.p.m. for the new speed long before the ship can accelerate up to that speed over the ground. The reason for this is obvious. While the increase in speed is going on the slip of the propellers is much higher than normally and the shaft horsepower is increased accordingly. A common instance

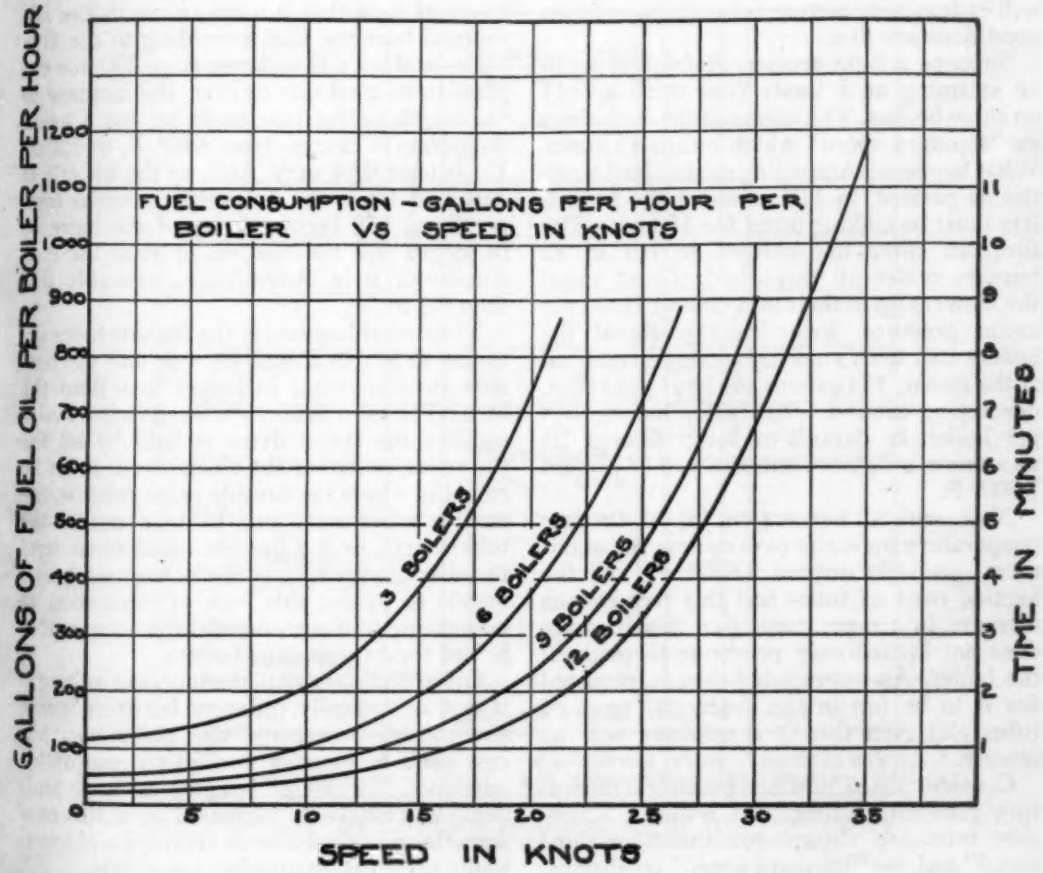


FIG. 1

of this presents itself when one ship tows another. The r.p.m. for speed made good are far greater than under ordinary conditions while the fuel per mile is much above that commonly used. All this is because the slip is so much greater than under normal conditions and hence the shaft horsepower is much greater, too. It is harder to move the ocean than the ship; and that is what you are trying to do when the slip increases. Dock trial when the ship is immovable and the slip is 100 per cent is the ultimate analogy of this condition for, unless cavitation occurs, it is found impossible to make more than a small fraction of the r.p.m. that the boiler power in use would give in the open sea.

For this reason, the greatest demand for steam, the highest rate of burning oil, and the heaviest strain on the boilers all come just when the boilers are trying to accommodate themselves to new and more arduous conditions And the next few paragraphs will endeavor to picture what those arduous conditions are like.

Suppose a light cruiser, *Raleigh* type, to be steaming at 5 knots (one-third speed) on three boilers. The officer of the deck rings up "standard speed" which means 15 knots. What happens? According to standard practice at present, in 1.25 minutes the propellers must be making turns for 15 knots. The fireroom force are obliged to cut in all burners under all three boilers and speed the blowers up to their maximum to hold the steam pressure. Prior to this signal the boilers had been coasting along burning oil at the rate of 133 gallons per hour per boiler, developing around 1,000 boiler horsepower per boiler. In default of better figures, let us assume a furnace temperature of around 1,000° F.

Now, with all burners cut in, the furnace temperature must rise to very near the maximum, probably around 2,800° F., and the fireside rows of tubes feel this tremendous increase in temperature, but this increase does not immediately penetrate throughout the boiler. An appreciable time is required for it to be felt in the outermost rows of tubes and even then it is nowhere near as intense.

Consider Fig. 2 in which possible temperature gradients through the walls of a fireside tube are shown for the "one-third speed" and the "standard speed" conditions. The difference between the furnace temperatures and the water (steam) temperature must give a temperature gradient in each case, which passes through three mediums: The film of gas on the fireside of the tube, the metal of the tube, and the film of water (steam) on the waterside of the tube. The study of film resistances leaves much to imagination, but a reasonable assumption is that the drop through the gas film is twice that through the hot water or steam film. With this assumption the absolute values may very well be shown as in Fig. 2. In assuming these arbitrary values, effort is made to stay on the conservative side.

In "case one" at 5 knots, one burner in operation, the mean tube temperature will be about 640° F. In "case two," 15 knots or accelerating up to it, six burners in operation, the mean tube temperature must be at least 1,370° F. The mean tube temperature has then increased 730° F. in the short space of time that it takes to cut in five additional burners. But, according to the formula in Mark's Handbook, page 300, for expansion of steel due to heat, the increase in the length of the tube must be, for a mean temperature change from 640° F. to 1,370° F., at least 0.94 inch. And, as the fireside is departed from, the difference in mean temperatures will become less and the increase in length will become less until at the outside rows it is insignificant, probably less than 0.1 inch.

Then what happens if the fireside tubes increase in length almost an inch and the outside rows increase in length less than 0.1 inch? The mud drums are fixed in the boiler saddles, the steam drum is held by all the the tubes, so either the steam drum must be caved in where the fireside tubes enter it, the outside tubes must tend to draw out of the tube sheets, or the fireside tubes must tend to walk into the tube sheets or else warp and buckle to permit this inch of expansion to take place. And any one of these occurrences is bad for express-type boilers.

Given sufficient time the increase in length is not as radically different between inside and outside rows, and the boiler can adjust itself to the new conditions gradually; but when the rate of burning oil is as suddenly and markedly increased as in this case something in the boiler is strained and eventually the weakest member gives way.

There is still another condition which may operate, given any unfavorable set of circumstances. The *Bureau of Engineering Manual* considers it in chap. 2, par. 2-302 (2):

> Extreme care should be exercised never to force a boiler to such extent that the rate of evaporation is too high, as this procedure is apt to break up the circulation of water in the boiler and cause sagging of the lower rows of tubes.

When five additional burners are suddenly thrown on a boiler which has been steaming on only one (six burners are all that *Raleigh's* boilers are fitted with) that boiler is being forced unduly. This sudden burst of heat, felt chiefly by the fireside tubes, causes such a rapid rate of evaporation that the water circulation does not follow up the steam formation. The result is a pocket of superheated steam and a section or sections of these fireside tubes which are heated far above the remainder of the tubes. This follows from the fact that the specific heat of steam is only 0.6 as against 1.0 of water, plus the additional heat absorbed as heat of vaporization. Naturally the temperature of the tube containing the superheated steam will rise far above that of tubes containing water and exposed to the same or lesser temperatures. Then a local but extreme expansion of the tubes thus overheated occurs, and this increase in length must be absorbed by the tubes either pushing further (walking) into the drums, or by the tubes warping and deflecting. And when a straight tube becomes deflected more than 1.5 inches it should be renewed. (*Bu. Eng. Manual*, 2-475.)

It is true that the boilers in light cruisers have been undergoing this rough treatment fairly successfully for some seven years now, but these boilers are no longer young. Some have already failed in service or given indications of failure. In the Italian Navy

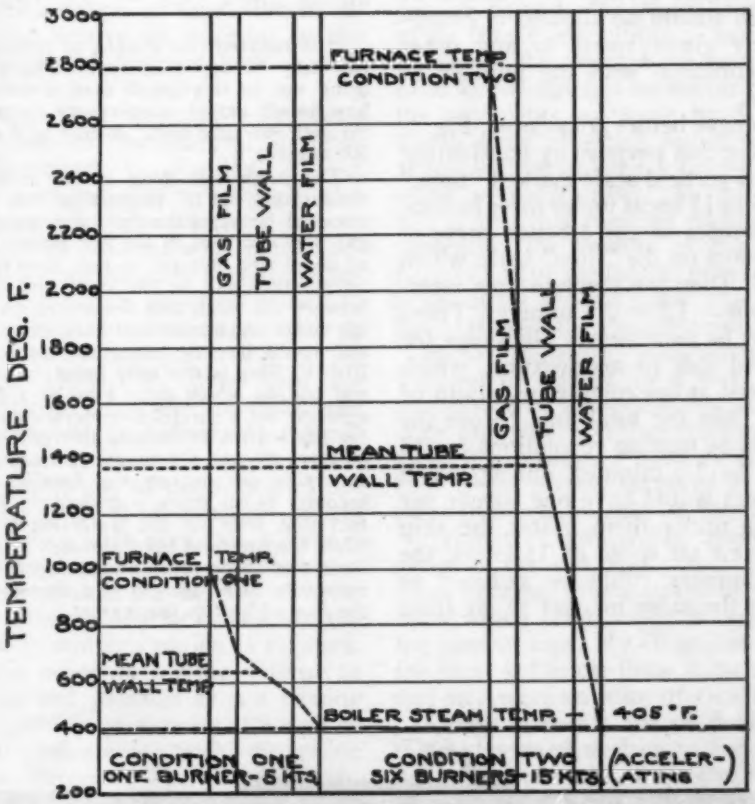


FIG. 2. TEMPERATURE GRADIENTS FROM FURNACE OR FLUE GAS TEMPERATURES AT FIRESIDE TUBES TO BOILER STEAM OR WATER

this fact has been recognized (See *Bulletin of Engineering Information No. 45* of Oct. 1, 1929.) and destroyers are forbidden to increase speed at a rate exceeding one mile per minute between 12 and 20 knots and one mile per minute and a half between 20 and 25 knots, with a further prohibition that variations of speed for maintaining formation must not exceed over twenty turns at one time.

It is suggested that a standard rate of acceleration be adopted, based on the number of boilers in use. This can be done by adopting a standard maximum rate of increasing the fuel oil supply to a boiler. It is suggested for consideration that the maximum rate of increasing the fuel oil supply be not over 100 gallons per hour in a minute, which is, on the *Raleigh*, approximately the increase in supply given by cutting in one more standard burner with a 7/64 tip and 250 pounds oil pressure. From such a basis a time-table can be worked out giving the number of minutes which should be allowed in changing from any given speed to any other speed, in accordance with the number of boilers in use.

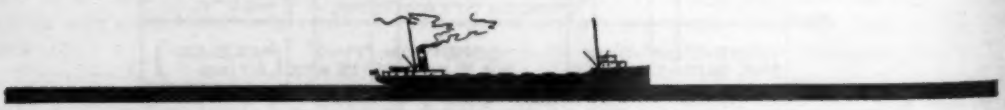
The same curve before considered, Fig. 1, can be used for this purpose by considering the right-hand vertical scale marked "time." To go from 5 to 15 knots under three boilers, take the intercepts of the 3-boiler curve at 5 and at 15 knots on the "time" scale, which are 1.5 and 4. Then the absolute time interval would be $4 - 1.5 = 2.5$ minutes. There must however be an arbitrary allowance for the extra load due to acceleration, which might be placed at one minute in default of better data. Then the total time before the engines would be making revolutions for 15 knots would be 3.5 minutes, during which time the boilers would have one burner per minute cut in under them. After the ship reached the new set speed of 15 knots, the number of burners could be reduced as necessary. In the same manner to go from 10 to 20 knots would take $(7.25 - 2) + 1$ for acceleration $= 6.25$ minutes if under three boilers, but if under six boilers would only require $(3.75 - 1) + 1 = 3.75$ minutes.

This would require careful instruction of the engineers on the throttle watch, to take all the extra steam made yet not to drop the steam pressure below a certain amount. But those details are easily worked out aboard ship and it is believed that the resulting gain in actual efficiency and longer life of boilers would be surprising if careful comparisons could be made.

Certainly if these steps are taken to prevent any undue forcing of boilers, the faithful "camels of the ocean" should have no cause for complaint of "overloading," but should serve on until general decrepitude puts an end to their labors, and engineer officers will cease to tremble in their boots every time "full speed" is rung up on the annunciators.

It is realized that graphs of temperature drops can only be approximations. The purpose is to bring out in this graph that it does not matter how much actual temperature drop takes place through the tube wall; it may be 5 or it may be 500 degrees.

The important thing is the mean tube wall temperature. If a proportion can be correctly assumed between the fall of temperature in the gas film and that in the hot water (steam) film of about two or three to one, then the mean tube temperature will be the same and the difference between the mean tube temperature at easy steaming under one burner and hard steaming under all six would be just about the same, i.e., around 700° F. This is the only point open to question, and one on which there may be a divergence of opinion; but a careful consideration of heat transfer has led me to assume this proportion of two or three to one. Of course if scale exists on the waterside or soot on the fireside, the problem becomes much more complicated. However, the fact that scale on the waterside tends to make tubes heat up and burn through leads me to believe that there must be considerable water film resistance there already if a thin scale can upset the flow of heat to that extent.



PRESENT PROBLEMS OF NAVAL REDUCTION

By Commander T. C. Kinkaid, U. S. Navy

IT IS extremely difficult for the average citizen, or for that matter even for the average naval officer with his technical knowledge and training, clearly to visualize the efforts that have been made and the results that have been attained toward the limitation and reduction of naval armaments. This is due not only to the intricacies of the subject itself—and it is a very complex one—but to the continuous efforts of certain writers to obscure the real issues at stake by a smoke screen of propaganda aimed at the furtherance of the special interests they represent. Pacifist societies of an internationalistic frame of mind find an almost unlimited source of material in the prolific writings of foreigners, both in their own publications and in ours.

The article entitled "Immediate Problems of Naval Reduction," by Admiral Sir Herbert W. Richmond, in *Foreign Affairs*, April, 1931, is an outstanding example of a type of writing that appears from time to time in American publications. In that article Admiral Richmond asks if anything has been done "in the true scientific spirit" to examine all the matters that must come up at the next conference (referring to the conference in 1935). He states that the question of size of ships was shirked at the London conference; that decisions regarding cruiser size and numbers were not "made in accordance with any of the principles upon which men in all other concerns in life base their practice." He says that a navy is one of the instruments for completing a state's security against the dangers of invasion and isolation which he claims are the only injuries to which a nation is exposed. He rejects the necessity for the defense of neutral rights and prestige as not coming within his definition of security although he devotes considerable space to the discussion of these two elements. Then he proceeds, presumably "in the true scientific spirit," to prove that Great Britain requires a much larger navy than the United States needs for "security." His arguments, based on examples from ancient history which are unrelated to the subject, are specious in the extreme. His "principles" of strategy and tactics are developed without a single reference to aviation or any other of the many recent technical developments. Finally, he says that he "can find neither strategical nor tactical reasons for any fighting ship of any power being larger than 6,500 tons."

Admiral Richmond's article is technically unsound; it does not fairly depict the efforts that have been and are being made to solve the problems of naval limitation and reduction; and, it is generally misleading as to the future possibilities of naval reduction. However, the average citizen without technical knowledge has no means of evaluating the arguments put forth by Admiral Richmond, some of which sound plausible. His article will be widely quoted by pacifists and other propagandists. The average reader will believe that Admiral Richmond's article represents the opinion of the British Admiralty and of the British government which is distinctly not the case. The thoughts he has expressed therein are peculiarly his own.

In the following paragraphs I have attempted to outline, in a way that can be understood by the uninitiated, what has been done and what is being done to solve these difficult problems. I have referred particularly to the present status of naval disarmament and have touched on the future of this movement. Considerable space has been given to the size and power of individual ships because that appears to be the point upon which propaganda is concentrated at the present time. My effort has been to give the facts as I know them in certain instances and an American point of view in others.

All governments are no doubt sincere in their expressed desires to reduce the burdens of armament and remove the causes of international distrust which reside in competitive building, and time has already shown that an agreement to limit is the most power-

ful factor which furthers that end. A limitation with the lowest practicable maximum limit is of course desirable, but, having in mind the end in view, the agreement to limit is far more important than the question of limitation upon a low basis.

The London conference produced a treaty whose terms are to remain in force until 1936 and provide that another conference be convened in 1935 to carry forward the work of limitation and reduction of naval armaments. That treaty, in addition to effecting certain reductions in capital ships, completed the work of the Washington treaty insofar as the three great naval powers are concerned by limiting cruisers, destroyers, and submarines. Two other powers adhered to certain parts of the London treaty and have since negotiated a basis of agreement with respect to the other parts of the treaty which has been published to the world. At the present writing an effort is being made to draft a British-Franco-Italian agreement from the basis of agreement already published. If this is successful, competitive building among the five most important naval powers will have been eliminated.

What, may we ask, has been accomplished since the London conference and what remains to be done? In addition to the prospective British-Franco-Italian agreement, much of great value has been accomplished in the past year. It will be remembered that the sixth session of the preparatory commission for the disarmament conference was interrupted to permit the London conference to attempt to solve the naval problems of the great naval powers. At the successful conclusion of the London conference the preparatory commission again met (November 6, 1930, sixth session—second part) and proceeded to formulate a draft convention and report. These two documents are the visible product of five years of hard work by the preparatory commission.

This preparatory commission, set up by a resolution adopted by the sixth assembly of the League of Nations on September 25, 1925, in conformity with the spirit of article 8 of the covenant, held six sessions, two in 1926, two in 1927, one in 1928, and the last which began in 1929, was suspended, and was resumed in 1930, as stated above. During that long period competent technical experts of the commission analyzed and discussed in great detail the technical aspects of limitation and reduction of armaments; able political experts thoroughly reviewed and debated the political considerations relating to disarmament. As a result of these labors all political and technical considerations have been brought to light and the attitude of the various powers with respect to each question is recorded in the minutes of the sessions of the preparatory commission and in the reports of the various subcommissions and committees, all of which have been widely distributed throughout the world.

After receiving the report of the preparatory commission, completed in December, 1930, the Council of the League of Nations designated February 2, 1932, as the date of meeting of the disarmament conference and Geneva as the probable place of meeting. Arthur Henderson, Great Britain's Foreign Minister, was designated President of the disarmament conference at the meeting of the Council on May 18, 1931. In the meantime all nations have been compiling data on the present status of their own armaments for the information of the council. Fifty-odd countries are expected to take part in the disarmament conference in 1932. Half that number were represented on the preparatory commission, whereas only five took part in the Washington and London conferences.

The immediate problem therefore is to effect agreement in 1932 among the half a hundred smaller powers which will bring them into a world-wide system of limitation of naval armaments, thus extending the limitation now in effect among the five great naval powers. Small powers have their own special problems and the naval chapter of the draft convention to be considered in 1932 was drawn up with special consideration for those particular interests. These smaller powers have before them the agreements of the five larger powers to use as models for their own agreements, which can be drafted to fit their own special conditions.

The conference in 1932 aims to limit land, sea, and air armaments but we are here considering only sea armaments. When this world-wide system of limitation of naval armaments has been made effective, competition in building will have ceased, and, as political considerations warrant, further reduction in armaments can readily be made.

Until such a system of limitation exists, the problem of reduction is infinitely more difficult.

To imply that nothing has been done "in the true scientific spirit" to solve these difficult problems gives a false impression. From the very beginning of the movement to limit and reduce naval armaments, its technical aspects have been studied with painstaking care in each of the countries concerned. Tactical and strategical effects have been thoroughly examined. Of course, the conclusions reached in the several countries do not entirely agree, for each power has its own particular situation in view and its own special interests to safeguard. Those studies are continuing and are being kept up to date by the consideration of the effect of such things as improvements in design of ships, new application of special processes to the construction of ships, developments in machinery, and improvements in aircraft. Many such technical changes have occurred in the last ten years.

Referring only to naval armaments, what, exactly, is the problem that future conferences have to solve? The object of the ratios established by past conferences is, as I understand it, so to apportion naval strength that one nation would hesitate to attack another because of the extreme hazard involved. At the coming conference, where fifty or more nations will be represented, ratios may or may not be used to establish the relative naval strength among the numerous small powers. It may be deemed more practical to consider directly the tonnages of the several powers. Limitations may be established according to the global theory, permitting the building of any types of ships desired within the total tonnage limits; or by specifically limiting each category of ships within the total tonnage limits; or by a combination of these two methods of limitation. Whatever procedure is followed, the purposes of the conference will be to remove a cause of international mistrust by preventing competitive building and to reduce the burdens of naval armaments. These have been the purposes of all past conferences.

To proceed too rapidly would be to risk destroying all that has been achieved toward the fulfillment of these purposes. That much has been accomplished already will be realized if the trend in naval armaments toward the end of the period of unlimited building is taken into consideration. Then there were building and projected large numbers of ships of enormous size. The original cost of those vessels and their cost of operation would have been a heavy burden upon the taxpayer. Competitive building would have been a constant international irritant. Surely, the stoppage of these two unwholesome conditions among the five great naval powers can be considered an accomplishment of some magnitude.

The inclusion of the smaller powers in the scheme of limitation will also be an important accomplishment. In addition to its direct benefits in reducing suspicion among these powers, their inclusion in a system of limitation would greatly reduce the military importance of alliances with the larger naval powers and would perhaps reduce the present tendency in this direction. The value to a power whose naval armament is limited, of an alliance with another power, even a small one, whose naval armament is not limited, is not difficult to imagine.

To proceed immediately to disarm in the literal sense of that word would produce an international condition as unwholesome as that produced by unlimited building. But the term "disarmament" is not used in that sense. Its exact meaning with reference to so-called "disarmament" conferences is clearly set forth in article 8 of the Covenant of the League of Nations which says in part "the maintenance of peace requires the reduction of national armaments to the lowest point consistent with national safety." Just what that "lowest point" is at the present time would be difficult to say. Nor can "national safety" be clearly defined. However, both are directly dependent upon the relations between nations. As these relations improve, armaments can be reduced. A first step toward the improvement in the relations between nations can be taken by definitely limiting naval armaments, thus doing away with competitive building and the suspicion engendered thereby. Other measures acting toward the improvement of international relations will then be in order before reduction in armaments can approach a "lowest point consistent with national safety" which will satisfy all purposes.

There are many causes that produce unsatisfactory international relations. To believe that the existence of armaments, or even that competition in armaments, is the

only source of international ill will is to be far from a realization of the true situation. We have to deal not only with the theory of disarmament but with the facts of the situation at the present time. The prominence that has been given to disarmament in the movement to promote peace has been due solely to the fact that disarmament is the only line of endeavor in which concrete results have been attained to date. Therefore it is the line of least resistance for that movement.

Much labor and thought have been applied to other measures for the improvement of international relations and the results are embodied in numerous pacts, covenants, and treaties such as the Pact of Paris, Locarno, etc. Were these "seasoned securities," acceptable at their face value, the possibility of war would indeed be remote. But the statesmen of the world today are far from being convinced.

There are but two securities for peace—respect for the rights of your neighbor, that is to say, a pacific policy, and adequate preparations against attack should that policy unfortunately fail.

Conferences to limit naval armaments attempt to work out their problems along two general lines. First, a maximum total tonnage limit which must not be exceeded is determined for each power. Second, the displacement and fighting strength of the individual units composing naval forces are limited. Of course, there are many details, such as methods of replacement and scrapping of old vessels, for which provision must be made.

As to the total size of the naval forces, every non-aggressive power desires to maintain a navy in sufficient strength to support its policies and its commerce, and to guard its home and over-sea possessions. This fundamental naval policy is the foundation upon which the whole movement stands. It means security against invasion, security against isolation, defense of neutral rights, and maintenance of prestige. It is upon this basis that agreements to limit naval armaments must be reached. It was with this background that the 5:5:3 ratios were agreed upon at Washington.

Efforts of writers to ignore or discount any of these elements of "national safety" should be looked upon with suspicion. Agreements to limit naval armaments made possible by intensive propaganda rather than as a result of a fair evaluation of the elements of national safety would be unsound and could not be expected to endure. The layman, particularly one in a receptive frame of mind, can readily be misled as to "principles" of strategy and tactics illustrated by examples taken from ancient history which, in fact, have no bearing on the subject. A statement that the strengths of forces "can be determined only by each individual nation according to its own needs" simply takes us back to the days of competitive building. To set forth the idea that the strength of the weakest power is the criterion in naval limitation is merely asking the reader to stand on his head. Any plea for ships to guard commerce disguises the equally important missions which they have of denying the sea to enemy commerce and of controlling neutral commerce. These functions are inseparably interlocked. Peace requires no guarding of commerce; war alone makes such demands on naval vessels. So we have to consider what effect combatant ships have in war, in order to arrive at a just decision.

In regard to the individual units composing naval forces, they must, of course, have the displacement and fighting strength necessary to enable them to perform their specific functions. Just what displacement and fighting strength are required by the various units is not a matter for arbitrary decision but is an engineering problem of some magnitude. The ship designer works out this problem in just the same manner as the bridge designer designs bridges or the construction engineer designs skyscrapers. Each has a wealth of scientific information and experience upon which to draw.

The real factors here involved are often obscured in a mass of technical details which leave the public completely in the dark. However, in spite of the verbal smoke screens that have been used to obscure the public view, it is not impossible to present the subject in a non-technical form that will be understandable to the layman.

The United States considers the battleship of particular importance for its own requirements; certain other powers possessing a strategically located chain of bases desire a large number of cruisers; others insist upon a large submarine tonnage. The present agitation to reduce the size and

fighting strength of battleships is aimed at the one type of particular importance to the United States, and is a first step toward the abolition of that type, which is relatively less important to the other powers. A fair method of reduction would be a proportionate reduction of each type, not the elimination of one. After naval armaments have been stabilized by the definite limitation of all types for all powers, such a reduction will be in order when political considerations permit.

The capital ship is the only type of ship that can take the sea and remain at sea for long periods under all conditions of service and weather. It is less dependent upon a well placed chain of bases than any other type. It is the only type that can be constructed to withstand reasonably well the attack of modern weapons.

With the advent of each new weapon, false prophets have predicted the death of the capital ship. Particularly was this true when the airplane became an important factor at sea. However, the development of aviation, far from proving the battleship to be obsolete, has emphasized the value of that type and given it added importance in the eyes of a navy. Formerly, the high speed of the cruiser made it secure against the attacks of other vessels. No ship that could defeat the cruiser could overtake it. But today, the speed of the airplane permits it to overtake any surface vessel, and only the capital ship can be adequately armed, protected, and subdivided to survive against bombing from the air.

The capital ship is the center from which radiate the light surface forces, the undersea forces, and the air forces in exercising control of the sea. Likewise, it is the rallying point on which all other types focus for mutual support. The battleship's "power of survival" makes it, as it has always been, the backbone of the fleet.

That it must perform these functions is the explanation of its size and power. These cannot be arbitrarily determined. Although the battleship costs less per ton to build and to operate than any other man-of-war, that fact has not been a deciding factor in past construction.

Obviously the battleship must be the most powerful type afloat. The larger it is, the better it can be safeguarded from air, surface, and submarine attack. Its main armament must be superior to that on any other type of vessel and should be capable of effective fire at extreme ranges. An efficient antiaircraft battery must be carried and means of repelling destroyer attack must be provided. Vertical armor, adequate to keep out the projectiles of a size corresponding to those fired by its own guns, must be fitted. There must be an armored deck of sufficient thickness to keep out aircraft bombs and projectiles fired at long range. The damage caused by torpedoes, mines, and aircraft bombs exploding under water alongside the ship must be localized and restricted by an intricate system of subdivision of the underwater body. Neglect of any one of these characteristics would make the ship vulnerable to some form of attack. Speed and cruising radius are also important. High speed is very desirable, but countries lacking bases must sacrifice speed or some other characteristic to obtain the cruising radius necessary to proceed to and from the scene of action.

Under the present treaty restrictions, all of these characteristics must be embodied in a displacement not exceeding 35,000 tons, which is hardly adequate to give full measure to each item. A movement to reduce the displacement and armament of capital ships is again coming to the fore and is being carefully considered by all powers. A progressive reduction in size would eventually reach a point at which the necessity for a large cruising radius in the case of powers lacking bases would force on them a sacrifice in the fighting characteristics of their capital ships as compared to those of other powers possessing a chain of bases. The restriction of capital ships to a small displacement, in effect making of them powerful cruisers, would render them incapable of performing the functions previously described and would vastly increase the relative importance of merchant vessels converted to fighting ships. Then, the value of a large merchant marine and a numerous chain of bases would be greatly enhanced.

Now we will consider cruisers, briefly. Fast frigates were the cruisers of the age of sails and wooden ships. Then there were no radio nor cable dispatches to provide information, no radio bearings to locate the enemy at sea, no airplanes to send hundreds of miles to reconnoiter, and no enemy aircraft to fear. Although used to interrupt

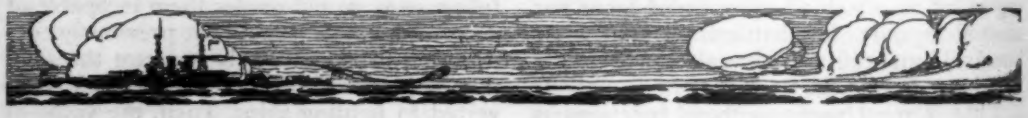
enemy trade, their primary mission was in the interest of information. They were expected to fight only their own kind. No ships that could defeat them could overtake them. Upon the advent of steam and steel small fast cruisers performed much the same duties. The introduction of the torpedo added to the cruiser's functions but had no important effect upon its general characteristics.

But conditions since then have vastly changed. Some of the outstanding recent technical developments are: More efficient fire-control systems and utilization of airplane observation of gunfire, resulting in increased battle ranges; greatly improved radio communications ashore and afloat, in the air and under the water; much better performance and greater reliability of aircraft; development of aircraft carriers and catapults; greater accuracy of antiaircraft gunfire; better armor protection and compartmentation of ships.

These technical developments make it necessary that a cruiser be equipped with an adequate antiaircraft battery; it should have an armored deck to protect against aircraft bombs and plunging, long-rang gunfire; its side armor should give protection at battle ranges against guns similar to its own; and its underwater body should be subdivided to provide against the mining effect of aircraft bombs landing in the water alongside it.

In other words, whereas formerly speed and gun power were the only necessary characteristics of cruisers, under present conditions they must be given the greatest possible power of survival. The treaty limit of 10,000 tons makes it necessary to compromise on the desirable characteristics and this presents an engineering problem that is not easy to solve.

Perhaps the above explanation has seemed long and complicated but so are the present problems of naval reduction. As stated in the first paragraph, a limitation with the lowest practicable maximum limit is desirable, but the agreement to limit has proved to be far more important than the question of limitation on a low basis. When limitation has been made universal reduction of the total tonnage limits can be effected as political considerations warrant. The reduction of displacement and fighting power of the individual units of naval forces below those necessary for the effective performance of their proper functions should never be permitted.



IN THE CANAL ZONE

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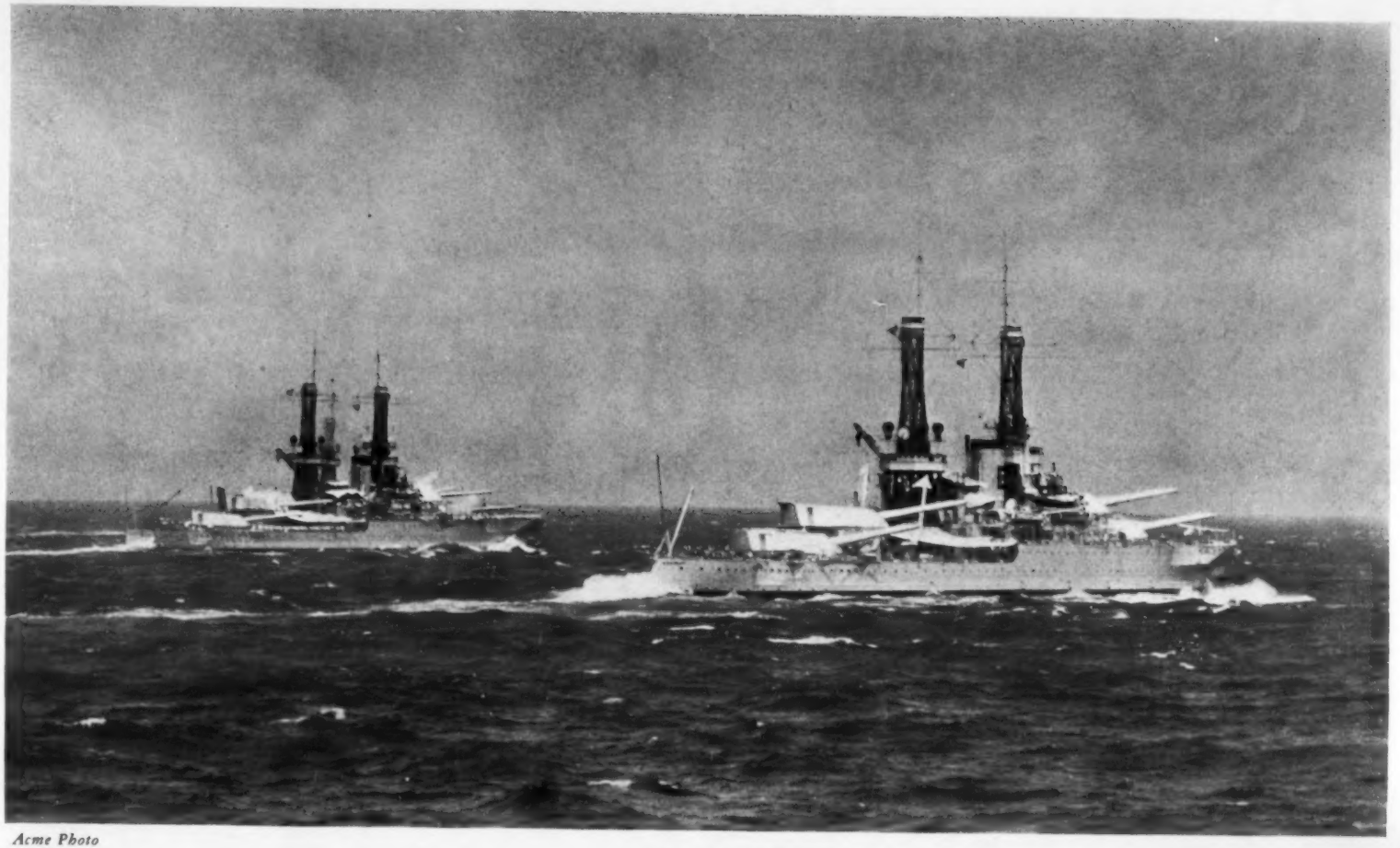

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FLEET MANEUVERS

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FLEET MANEUVERS

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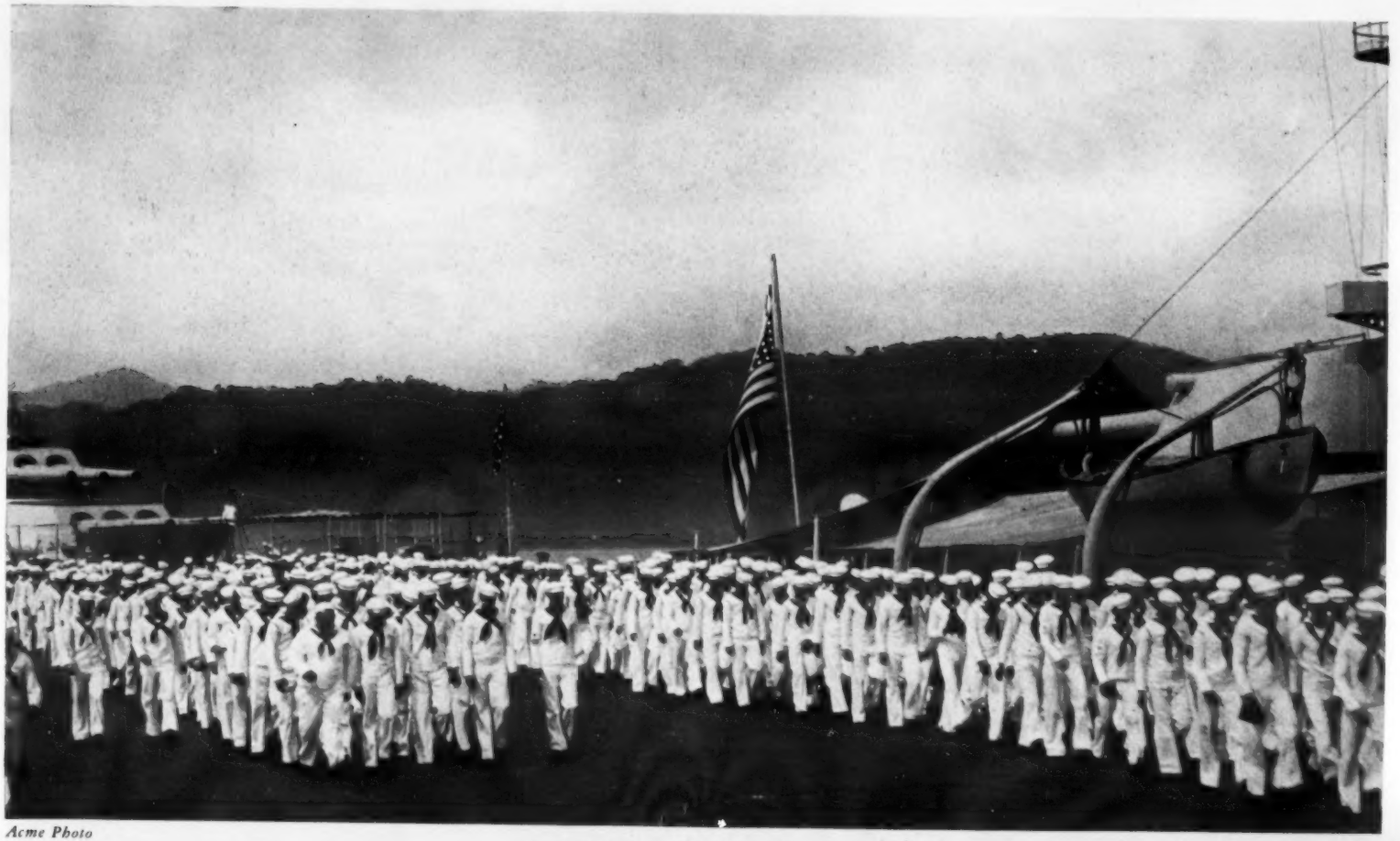
A SUBMARINE ON THE SURFACE



Acme Photo

LIBERTY PARTY AT PANAMA

Acme Photo

LIBERTY PARTY AT PANAMA

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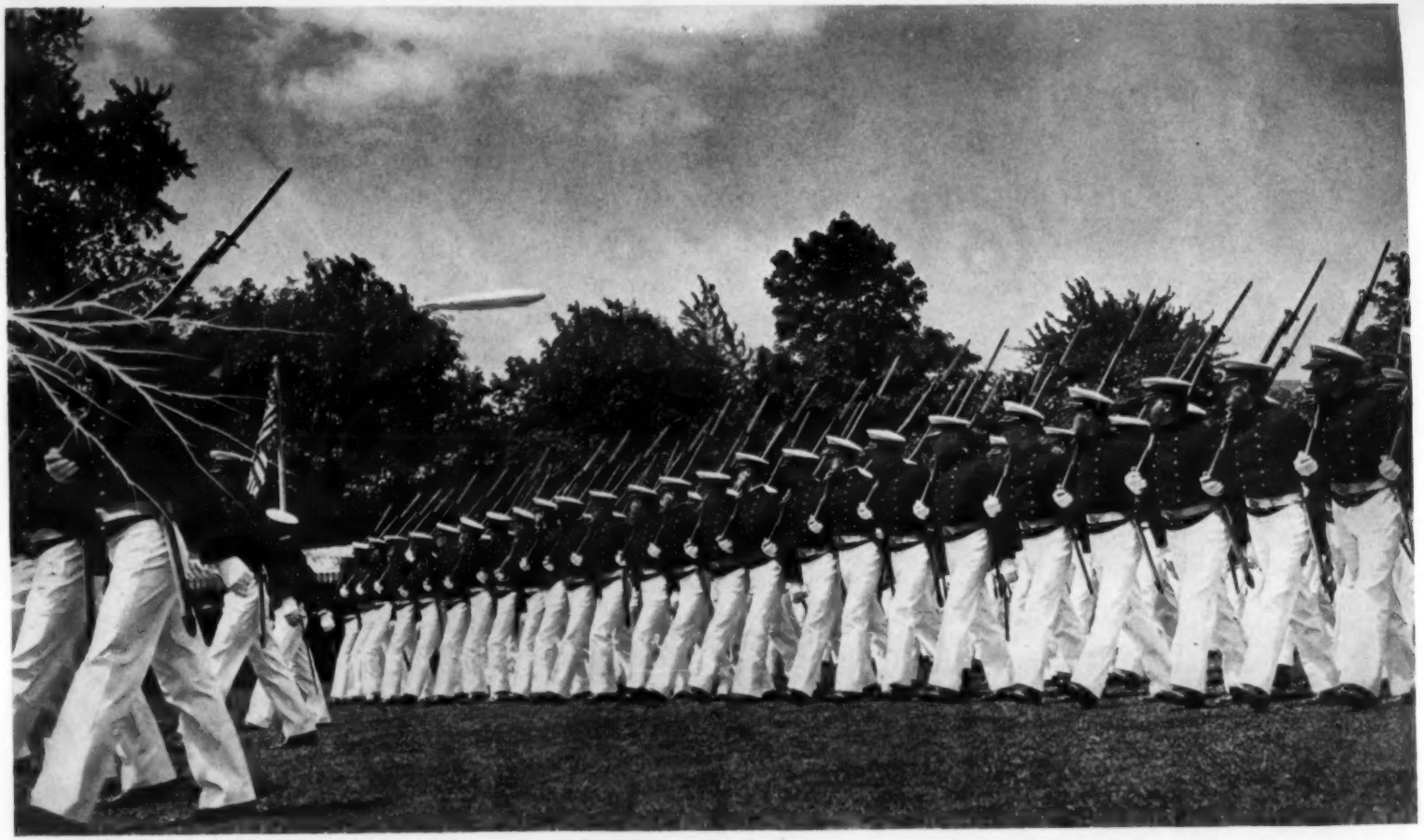
A BATTLESHIP AT SEA

Underwood and Underwood

DESTROYER SMOKE SCREEN

Underwood and Underwood

DESTROYER SMOKE SCREEN



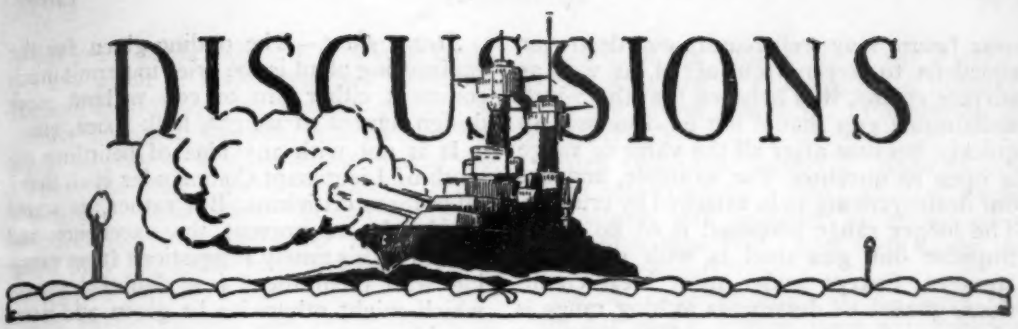
Acme—P & A Photo

"PASS IN REVIEW"

JUNE WEEK SCENE

Acme—P & A Photo

DISCUSSIONS



New Destroyers

(See page 464, April, 1931, PROCEEDINGS)

COMMANDER W. R. CARTER, U. S. NAVY.—Lieutenant Commander Hull's article on "New Destroyers" is timely and interesting and indicates that he has given the problem his own interest and therefore considerable thought. There are many points which he brings out, which it is hoped the designers will bear in mind. But, since he has proposed so many good features, it is felt necessary to criticize a few of the doubtful ones, lest they be overlooked in the wealth of good ones.

It is, as a previous destroyer officer, that I assume the right to commend and criticize.

General features.—The length to breadth ratio is heartily endorsed, as is also the V-bottom and cutaway stern.

"The old high forecastle is resurrected in order to raise the bow and bridge and yet keep other top weights as low as possible" is thoroughly disapproved, on the score of difficulty in handling in strong winds. The old high forecastle vessel was very difficult to handle at moderate speeds in strong winds, and it was only under considerable power that the high forecastle ships could be handled at all in some kinds of wind. Since there will be much of this open sea handling, it should be made as easy as possible. I am not considering the difficulty of handling alongside docks, buoys, tenders, etc. If that were all, I should be perfectly willing to concede the high forecastle for the advantage claimed.

The adoption of two smokestacks is a good one, provided the problem of uptakes can be solved (and it will, no doubt) for this will make much more room on the main deck.

The value of the tripod foremast for vessels whose primary duty is gun fighting cannot be questioned; that there is necessity for such a mast, in a destroyer, is open to doubt.

Armor.—On the question of armor, I believe the writer was trying to prove the necessity for something which he wanted but could not entirely rationalize to his own satisfaction. True, a single fighting plane with a machine gun, unopposed by either planes or antiaircraft weapons, could repeatedly swoop down and inflict severe casualties on the personnel of our present destroyers. But is a single fighting plane, or a squadron of fighting planes, going to give such attention to a destroyer until it has not only gained control of the air, but also over all our vessels larger than destroyers? When that has been gained it makes very little difference whether we have armor on our destroyers or not, as far as the final results of the campaign are concerned. I would prefer to put the extra weight of this armor, provided the ship can be designed to carry it, into structural stiffeners which will permit driving the ship into heavy seas at high speed.

Torpedo armament.—Is thoroughly approved of, except for one thing, and that is the grouping of all four tubes at one point. This, I think, is putting too many eggs in one basket. One shell might well disable all four torpedo mounts. The staggered arrangement now existing on destroyers is much preferred.

Gun armament.—The proposal of centerline guns, with as high arcs as possible is considered splendid. The question of caliber, however, is perhaps open to question. He states that the present 5-inch semiautomatic antiaircraft gun on our capital ships could be adapted for destroyer use, but its range is hardly great enough. In view of the fact that as an antiaircraft weapon it is rated among the best and that our tactics of the

near future may well require our destroyer squadron to screen from aërial, as well as surface enemy, it is believed that the 5-inch antiaircraft gun should not be dismissed so quickly, because after all the value of range is open to question. For example, suppose our destroyers are to be attacked by cruisers. The longer range proposed is of no value. Suppose our gun duel is with other destroyers. Except under most ideal conditions, gunfire of destroyers at long range is not a very serious menace. They are not designed as gun fighting vessels. Probably before fire becomes very effective the antiaircraft 5-inch will also be effective. In the case of heavily armed merchantmen it might just as well be assumed that the merchantmen will carry 6-inch guns which will outrange anything that a destroyer may carry, and so the latter is very little better off with the proposed 4.5-inch 45-caliber gun than with the 5-inch semiautomatic antiaircraft gun. So, take it by and large, if the present 5-inch semiautomatic antiaircraft gun can be adopted for destroyer use, I should be inclined to give it the most serious consideration. The control apparatus proposed is heartily endorsed.

General construction and repair features.—In general, the features mentioned under construction and repair are thought to be excellent. Particularly the cold storage idea and the electric auxiliary machinery. The latter has all the advantages stated and at least one other, namely, when our steam plant is *disabled,* we may still operate our auxiliaries. The water-tight features proposed are splendid if not too inconvenient. At least the attempt should be made to carry out the idea as far as possible.

The arrangement of living spaces is not concurred in and except for the gaining of a larger quarter-deck there seems to be no reason given for the change. It is believed that better mental reaction, and consequently higher efficiency on the part of the officers of a destroyer, will be attained with quarters adjacent to the bridge. I have discussed this with several destroyer officers and they are unanimous that at sea they prefer the officers quarters forward. Of course, the commanding officer would live on the bridge at sea. However, there is another point, the deck and engineer forces may be better controlled and handled when in separate quarters, as is the case on our present destroyers.

Steam plant.—The outline given for the engineering plant is too brief to permit much comment either pro or con without more design figures of weight, bulk space, etc.

It is not with any idea of belittling the work of Lieutenant Commander Hull that I offer these criticisms. But rather, as stated previously, to prevent the excellence and wealth of his timely suggestions from carrying with them these few doubtful points, which might otherwise be given additional consideration.

However, in designing a ship, just as in designing a tool, should not the principal purpose be the point to concentrate upon? If the principal purpose is to carry twelve 25-inch torpedoes to a launching position in the open sea, at speeds as high as 38 knots; then the first point to concentrate upon is the tool (vessel) best suited to do it. Then when this has been designed if it is found that secondary purposes such as scouting, screening, etc., may by some adaptation be also accomplished by the same tool (vessel), then let the best adaptation (guns, radio, depth charges, cruising radius, quarters, etc.) possible, be carefully weighed and balanced, but, never against anything affecting the principal purpose.

The Early History of the Screw Propeller

(See page 485, April, 1931, PROCEEDINGS)

G. VOITOUX, CAPITAINE DE VAISSEAU E. R.—From the opposide side of the Atlantic, may I beg the favor of adding a few lines to the very interesting article just published by Commander Davis.

The preconceived belief which lay in the bosom of most men on earth, whatever is their nationality, had up to this day brought me to believe that the screw propeller had been invented by a Frenchman. Each time I visited the Musée de la Marine (Louvrel, Paris) I passed alongside a stand supporting a screw propeller attributed to Frédéric Sauvage, said *Inventeur de l'hélice pour la propulsion des navires.*

Of course I expected that the above name would appear in the article just written on the matter; but perusing it I felt a sort of disappointment in finding that our countryman was unknown across the ocean.

An impromptu study of the matter brought me the following data: Frédéric Sauvage (1785-1857) was born at Boulogne sur Mer and took his patent in 1832. But

it fell in the public property before he could get any profit of his efforts and sacrifices. Ruined, spoiled by unscrupulous plagiaries, greatly indebted, he was incarcerated for debts, and finally died an insane man at the Picpus Hospital, Paris. Francis Pettie Smith had his invention "Of an improved propeller for steam and other vessels" patented May 31, 1836. John Ericsson took a like patent July 13, 1836.

The simple remark that here follows is that Frédéric Sauvage preceded both Smith and Ericsson, having taken his patent May 28, 1832. (It may be added that F. Sauvage has subsequently been the collaborator of Augustin Normand, with the British Engineer Barnes.)

Of course the idea belongs to none of them: It certainly is, as Commander Davis says, an ancient contrivance. In fact the origin of the screw propeller in America and Europa may be admitted to derive from the log of Hooke (1683). Since then the idea developed in the mind of many others, among whom may be cited the following names, which are certainly all known by our American friends:

Duquest may have been the first (1727) to suggest the propulsion of ships by means of a screw.

Bushnell is said to have manned (1776) a submarine fitted with two screws, one propulsive, the other acting vertically. Both were manned by hand.

Between Duquest and Bushnell, a certain Paucton, in his *Théorie de la vis d'Archimède,* imagined a helicoid, hand manned, as a propulsory for ships. (Publication at Paris, 1768.)

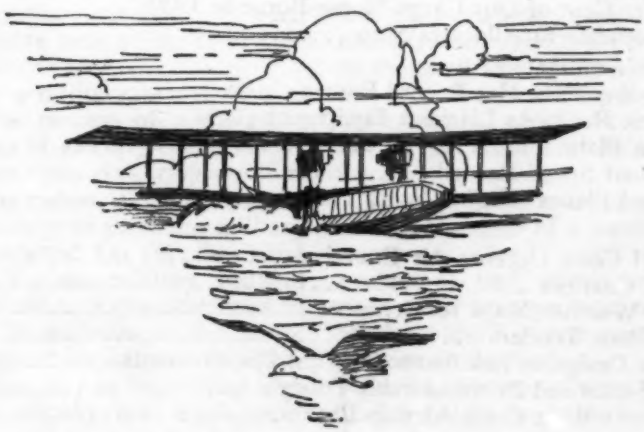
Fitch imagined (1796) a steam launch which was tried on a pond at New York. The launch was propelled by means of a screw of a type that "may have lately inspired Woodcroft."

Fulton, experimenting (1798) with the *Nautilus* at Le Havre, used a propulsive screw and a second one acting vertically, both being manned by hand. Each had four blades, "quite like those presently used."

Dallery, an engineer, patented (1803) the idea of using a machine able to work two screws that should be placed, either on the bow and stern, or on each side.

Stevens, while at Hoboken, tried a steam launch with two propellers and then with only one. These propellers had four blades. I was informed that the machine and the screws are still at the American Museum at Washington. A contemporary model is said to have been placed at the Stevens Institute at Hoboken.

Ericsson, Smith, as well as Sauvage, used a track fairly prepared by many others, at least so far as screw propulsion goes. Ericsson distinguished himself far more in his life than in the occurrence aforementioned. Were he the sole inventor of the screw for propelling ships (as I erroneously thought Sauvage was) it would add nothing to his great fame.



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MAY 2 TO JUNE 1

COMMANDER D. B. BEARY, U. S. NAVY
LIEUTENANT COMMANDER D. C. RAMSEY, U. S. NAVY
AND
PROFESSOR HENRY BLUESTONE, U. S. NAVAL ACADEMY

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UNITED STATES

Design and Construction of Warships

Shipbuilder and Marine Engine-Builder, April, 1931.—By Rear Admiral George H. Rock (C.C.), U. S. Navy. The limitations set by the Washington treaty upon cruiser design impose an upper limit upon the displacement in standard condition of 10,000 tons, and the armament is not permitted to include guns exceeding eight inches in caliber. Standard displacement as defined in the treaty corresponds to the ship complete and ready for sea, with stores and ammunition on board, but without fuel and reserve feed water. Thus, a 10,000-ton ship by the treaty definition corresponds very closely to what would formerly have been a ship of 11,600-tons normal displacement.

In the case of a military vessel such as these cruisers, the success of a design is measured in terms of military effectiveness, i.e., seaworthiness, gun power, protection, speed, and cruising radius. Weight expended beyond that necessary to meet the military characteristics is wasted. On the other hand weight saved in the non-military features helps to bring the military characteristics to their maximum. In addition to the above reasons for the great importance of lightness in construction, it was imperative also that these ships should not finish over weight, as this would have violated a provision of the Washington treaty. The primary problem, therefore, became one of saving hull weight.

The general characteristics of the design are:

(a) Battery of ten 8-inch, 55-caliber guns and four 5-inch, 25-caliber antiaircraft guns.
(b) Speed of 32.5 knots.
(c) Four aëroplanes and two catapults.
(d) Protection as indicated in Fig. 1.

Of these characteristics, the protection presented the most difficult problem, and, as finally determined, was the maximum permissible under the limitations imposed by the displacement and the other essential characteristics.

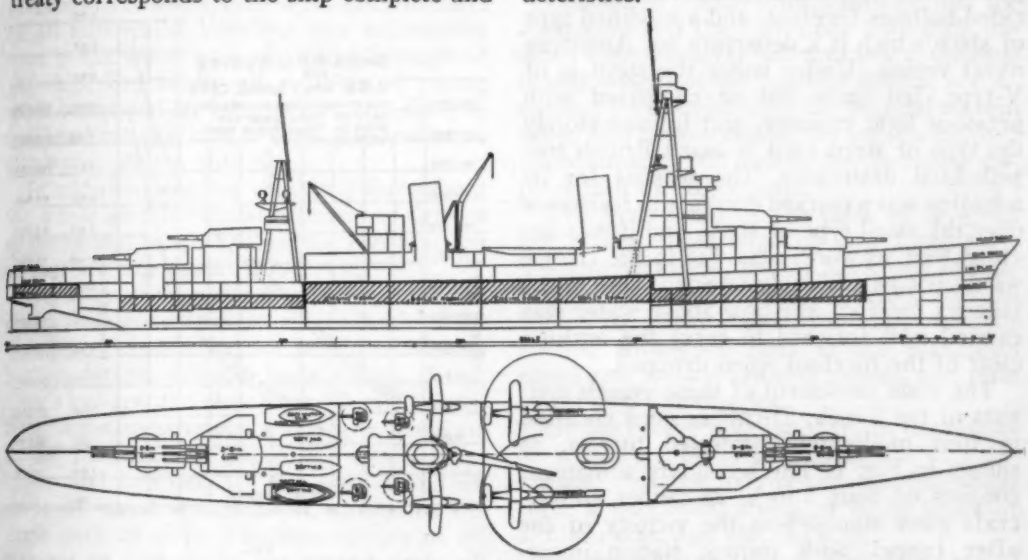


FIG. 1.—U.S.S. *SALT LAKE CITY* AND *PENSACOLA*

In designing the structure, the scantlings were reduced to what was felt to be the minimum consistent with strength. Medium steel was used generally, except in main strength members throughout the upper two strakes of the shell and in the plating of the main and second decks. Here high-tensile or special-treatment steel was used, but stresses above those considered safe for medium steel were not accepted.

The calculated stresses accepted, with the ship on the crest of a standard wave, under emergency load condition (maximum amount of fuel, stores, and ammunition), were 10.80 tons per square inch tension in the deck, and 8.04 tons per square inch compression in the keel.

Savings in weight were also, and in particular, sought for in the many detail fittings throughout the ship.

The design of the *Salt Lake City* and *Pensacola* as finally prepared is as shown in the views of Fig. 1.

The general dimensions of these ships are as follow:

Length over-all	585 ft. 6 in.
Length on water line	570 ft. 0 in.
Breadth molded at water line	63 ft. 5⅜ in.
Breadth extreme	65 ft. 3 in.
Displacement standard	10,000 tons
Displacement to designed water line	11,568 tons
Draught to designed water line	19 ft. 6½ in.

The design is characterized by a flush main deck with marked sheer forward. The underwater form is characterized by a decided bulbous forefoot, and a modified type of stern which is a departure for American naval vessels. Under water the stern is of V-type, but quite flat as compared with previous light cruisers, and follows closely the type of stern used in many British torpedo-boat destroyers. The reasons for its adoption was a marked decrease in resistance over the usual type of stern, and it was decided that seaworthiness due to the change would not be adversely affected. Due to the bulbous forefoot, the bow above water was carried well forward to carry the anchors clear of the forefoot when dropped.

The main armament of these vessels consists of ten 8-inch, 55-caliber guns enclosed in four moderately protected turrets, as shown in Fig. 1. The secondary armament consists of four 5-inch, 25-caliber antiaircraft guns mounted in the vicinity of the after funnel, with control station immediately adjacent.

The propelling machinery, which is of 107,000 horsepower, is disposed in two engine-rooms and two boiler-rooms, an alternating arrangement being adopted to increase the protection against complete disablement.

The main machinery consists of four sets of Parsons, Cramp-type, turbines with De Laval single-reduction gears. The two outboard sets are in the forward engine-room. and the two inboard sets in the after engine-room. Each set consists of one high-pressure, one low-pressure and one astern turbine, an additional cruising turbine with single-reduction gear being connected to each high-pressure turbine by a Metten clutch. The astern turbine is fitted in the low-pressure turbine casing.

There are eight White-Forster boilers having 9,500 square feet of heating surface, with a working pressure of 300 lb. gauge, installed in two boiler-rooms.

The general extent of the protection is shown in Fig. 1, and is concentrated around the magazines, main machinery, and steering gear. The protection to the machinery spaces consists of a side belt extending from the deck overhead to well below the water line —the belt running from end to end of the compartments—combined with a light protective deck overhead. The forward magazines are protected by a water-line belt, which also serves to protect the buoyancy and stability of the vessel forward, combined with a protective deck overhead; while in the case of the after magazines and steering gear the protection is brought in close to the spaces to be protected, in order to concentrate this protection around the vital areas and conserve weight.

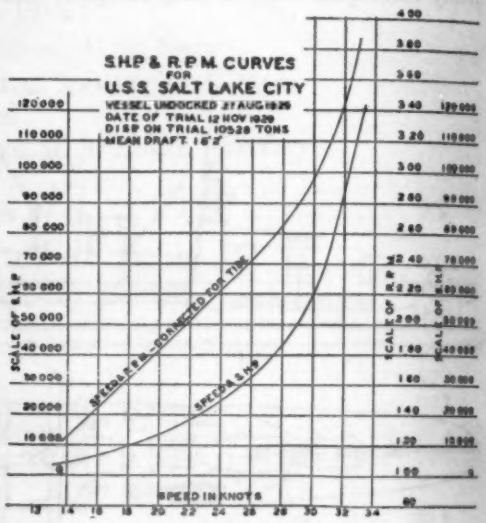


FIG. 2

The main-battery guns and mountings have splinter protection only, but protection to the powder is secured by wide separation and light armoring of the hoists serving each main gun position.

Next in interest to the principal characteristics of the ship are the detail features of the design, as it was the weight economy effected in these that contributed largely to the realization of the requirements on the limited displacement.

Welding was employed more generally than in any previous class of ships. There was no general adoption of welding throughout the structure of the ship as a whole; but in positions where local strength rather than

general structural strength was involved, and for the attachment of fittings, welding was adopted. The most extensive welding specified was throughout the first and second platform decks forward and aft. These platform decks are generally of 12 to 9 lb. plating, the joints being full, continuous welds and connected to the supporting beams by light, intermittent welds. In addition to the platform decks, all seams and butts of the superstructure deck, upper platforms and deckhouses were welded. Special welded brackets were also specified for the stiffeners of all bulkheads. Welding was extensively used in the water and oil piping throughout the ship. Practically all sections of piping were connected by butt welds; and flanges, bulkhead fittings, cast elbows, and tees were eliminated almost entirely.

In addition, welding was used throughout the whole ship for the attachment of fittings to decks and bulkheads, in the construction of hatches and hatch frames, etc.

An alloy of aluminum was adopted generally throughout the ship for all minor divisional bulkheads and for furniture such as built-in bunks, officers' mess tables, desks, crew's lockers, and chairs for officers' cabins, staterooms, messrooms, and offices. Thus, of all the furniture on board, the crew's mess tables and benches are the only furniture made of wood. In addition, numerous fittings, such as airport frames, covers of all airports on and above the second deck, all ladder treads, and the bedplates of motors and auxiliaries where these are not subjected to shock, were manufactured from this alloy. Intimate contact between the aluminum alloy and dissimilar materials, such as steel, brass, bronze or copper, must be avoided by inserting insulating material between the faying surfaces of the two metals.

It was decided that the exposed decks must be covered with wood, and teak, two inches in thickness, was finally adopted. The upper surface of the main deck was kept flush to avoid undue reduction in the thickness of the wood deck.

In lieu of the light metal ceiling inside the frames, a sheathing of 1-inch cork was specified to be fitted throughout all the living spaces. This was fitted in slabs, which were cemented directly to the ship's structure.

Aluminum paint was adopted generally as the priming coat throughout these ships and as the finishing coat in storerooms and lower deck spaces. The saving in weight resulting from the use of this paint, as compared with oil paints, was very considerable.

Both the *Salt Lake City* and the *Pensacola* were completed during the 1929-30 winter, the *Salt Lake City* going into commission on December 11, 1929, and the *Pensacola* on February 6, 1930. With regard to displacement as completed, the results were surprising in showing how much weight could be saved by careful design and attention to detail.

Completed displacements showed that the *Pensacola* and the *Salt Lake City* each finished approximately 650 tons below the estimated weight of the original design, not including the margin. With the original margin taken into consideration, the vessels finished approximately 900 tons under the treaty displacement of 10,000 tons.

The first vessel of the class to be given her official trials was the *Salt Lake City*. These were carried out off Rockland, Maine, beginning on November 12, 1930, and included the usual standardization at various speeds, endurance runs at the maximum speed and various cruising speeds, and tests of the ship's auxiliaries.

On the progressive speed trials, the results of which are given in Fig. 2, the ship developed, for the average of the full-speed runs, a maximum speed of 32.78 knots at 372.06 r.p.m. and 107,746 s.hp.

On the other endurance, fuel consumption and special trials, the hull, main machinery and auxiliaries all performed in a most satisfactory manner, and the expectations of the designers and the guarantees of the builders were fulfilled. The seaworthiness of the vessel proved excellent, and indicated that the choice of underwater form, based particularly upon a desire for high speed with minimum power, had not interfered with the seagoing qualities.

In only one respect was there evident a sign of local weakness which might be considered as largely due to the drastic reduction in weights generally throughout the design. This was in vibration, which at high speeds developed in the vicinity of the stern from approximately the position of the forward propeller struts aft. This vibration apparently came partly from the pounding of the water from the propellers against the under side of the flat stern, and partly from vibrations transmitted directly up into the ship

by the after struts. It is very probable that the fundamental cause of the vibration was the presence of cavitation around the struts at high speed, and the fact that the structure was light made the condition evident. No general vibration of the ship took place, but simply a local intense vibration which communicated itself in general throughout the ship's structure. Additional stiffening has been effectively fitted in some of the later ships of the class.

In the class designed immediately after the *Salt Lake City* and *Pensacola*, the main armament was changed to nine 8-inch guns in three triple turrets. By the sacrifice of one gun considerable savings in weight and space were realized, which permitted the disposition of the boilers into four boiler-rooms instead of two. This considerably increased the resistance of these later ships to underwater attack, allowed the provision of hangars for the proper protection of the aëroplanes, and permitted somewhat increased protection. This arrangement has been followed in all succeeding classes. In these ships, also, the use of welding has been extended consistently.

The *Louisville*, another of the class now nearing completion at the Puget Sound Navy Yard, is the first of the Navy's combatant vessels to be built in a dry dock, especially designed and equipped for ship construction.

This dock, which is of sufficient size for the simultaneous construction of two such cruisers, is a shallow concrete dry dock 927 feet in length, 130 feet wide, and with a depth of water over the blocks of 23.5 feet at high water. Two electric revolving hammerhead traveling cranes, each of 15 tons capacity, are installed at each side of the dock, and the usual electric and pneumatic power lines are available.

GREAT BRITAIN

Naval Problems of Today

The Engineer, May 8.—A movement has been set on foot to re-establish coal as the principal fuel for British warships. Much as we sympathize with the motives of those who have launched this campaign, we fear they are doomed to disappointment. There is, in our judgment, not the slightest possibility of a reversion to coal for the use of the Navy. In this sphere the advantages of liquid fuel over solid have been thoroughly demonstrated by an experience of nearly twenty years, and by the great majority of naval officers they are acknowledged to be overwhelming. These advantages are both strategic and technical. They are so obvious, and have been so often set forth in the utmost detail in our own columns and elsewhere, that it would be superfluous to recapitulate them now. It is certainly unfortunate that the Navy should be wholly dependent on imported fuel, nearly 70 per cent of which comes from non-British sources, and every plan for reducing this dependence is deserving of sympathetic consideration. But the proposal to revert to coal must be dismissed as impracticable. Were it to be adopted our warships would become definitely inferior to those of other navies in speed, radius, and general mobility, as also in protection. Coal has ceased to be of interest to the Navy save as a material from which oil may be extracted. Existing methods of extraction are, however, much too expensive to enable the product to compete with imported oil, though research may eventually lead to a more economical process which will remove this disadvantage. We may add that even were it feasible to restore coal to its former supremacy in the Navy, the coal trade would only benefit to the extent of about a million tons a year. The promoters of the "back to coal" campaign seem to forget that the Navy has already shrunk to less than half its pre-war dimensions, and may be still further reduced by international agreement. The decreasing demand for steam coal is due mainly to the increasing use of liquid fuel by the mercantile marine, the Navy being quite a secondary factor in the matter.

It is curious to find in so ardent a naval reformer as Captain Bernard Acworth, R.N., the chief advocate of coal versus oil. He deals with this question at considerable length in his recent book, *Navies of Today and Tomorrow*, which is, in effect, a penetrating and critical analysis of current naval policy. While unable to accept his views on the fuel problem, we believe many of his criticisms on other aspects of the naval administration to be well warranted and sound. His main thesis concerns the extraordinary complexity and staggering cost of modern naval material. The *Nelson* and *Rodney* are striking examples of this tendency. They are, without doubt, very fine ships, but

whether they represent good value for the £15,000,000 which they cost together is at least a debatable point. According to Captain Acworth, they "are a species of craft which, by common consent will never again be allowed to disfigure the sea. Their dimensions are such as to preclude their employment in parts of the world where docks are not available for their reception. Their mountings are a source of continual anxiety and refit. . . . So concentrated is the fire-control machinery that a single luckily placed shell might well put all nine 16-inch guns out of action. Their triple turrets are unsatisfactory. . . . Internally the ships resemble a science museum more closely than a man-of-war, the complication being well-nigh infinite." This is a very serious indictment, coming, as it does, from an experienced naval officer who must be writing from personal knowledge. We, too, when visiting the ships in question, have been amazed at the elaborate, highly intricate, and costly mechanical contrivances which are to be met with everywhere on board. Whatever the other merits of all these devices, they apparently do not conduce to economy of labor, for the ship's company is unusually large—about 1,350 officers and men. There are two submerged tubes for firing the 24-inch torpedo, the existence of which was until recently an official secret. Why these tubes were installed is a mystery, for one of the positive lessons of the war was the absolute uselessness of a torpedo armament in large ships. Nor can we dissent from Captain Acworth's strictures on the new 10,000-ton cruisers, costing £2,000,000 apiece, packed with machinery and so devoid of armor protection as to be vulnerable to shells of almost any caliber. Why, again, was it considered necessary to spend £1,000,000 on the repair ship *Resource*? Our post-war destroyers are costing about £500,000 each, yet their machinery is alleged to be giving trouble. These craft, it seems to us, are much too large and expensive to be risked for torpedo work, but if that is not their principal *raison d'être*, why are they overburdened with eight tubes? That our latest submarines are indifferently successful is no secret. Captain Acworth, who speaks with all the authority of one who commanded submarines for many years, believes our present building policy in respect of these craft to be retrograde. In the first L-boats, completed early in the war, we had an excellent all-round type of submarine, of moderate tonnage and cost, which met every reasonable requirement. They could only be improved upon "by simplifying still further their internal mechanism and by doing away with heavy and costly mechanical plant employed to do work that could be more simply and satisfactorily done by hand." Instead of this, later boats have shown a progressive increase in size and internal complexity without any corresponding gain in efficiency. Since the war we have spent untold millions on aircraft carriers, the first cost of which has probably been exceeded by the frequent and extensive refits they have undergone. Can it be pretended that these vast sums of money have been wisely invested? The peculiar disabilities of the aircraft carrier in its present form were dramatically shown on the occasion of H.M.S. *Glorious* collision with the French liner *Florida* some weeks ago. When the impact occurred most of her machines were in the air, and, owing to damage to the flight deck of the mother-ship and the rescue work in which she was engaged they were unable to return to her. Most of them were fortunate enough to reach land, but two fell into the sea and were lost. This incident has raised fresh doubts as to the practical value of our big carriers, the construction and maintenance of which imposes a very heavy burden on the Navy estimates. It seems evident, therefore, that the time has come to subject the whole question of naval construction and equipment to a searching inquiry. In view of present conditions, every penny that is voted for the Navy should be laid out to the best advantage. This can be done only by defining the functions of each type of warship, and then planning the smallest and cheapest vessel capable of fulfilling those functions.

Captain Acworth has performed a public service in drawing attention to certain grave shortcomings in naval policy. His criticisms are by no means wholly destructive, for he offers many suggestions which, if acted upon, would, in his judgment, provide us with a thoroughly efficient fleet at no additional cost. His views on ship design are too revolutionary to command general approval. He would, for example, abolish destroyers and aircraft carriers, leaving only battleships, armored cruisers and light cruisers. His battleship of the future would be a coal-

burning vessel of 12,000 tons, strongly armored to resist 16-inch gunfire, with a maximum speed of 17.5 knots, a main armament of six 13.5-inch guns—and nothing else. Such a vessel, he considers, could be built for approximately £1,000,000, but we think that if he doubled his estimate he would be nearer the mark. As will be seen, he attaches no value to high speed, but his arguments on this head are not convincing. His case against mounting any medium guns is vitiated by the misstatement that war experience proved the secondary armament of battleships to be useless. It is, on the contrary, an attested fact that the German battle fleet on the night of Jutland escaped serious loss mainly by the good use it made of its secondary armaments in repelling the repeated attacks by British destroyers. In general, however, Captain Acworth's suggestions are worthy of serious attention, and we propose to examine them in more detail in a future issue. May we venture to hope that his zeal for naval reform will not be entirely quenched by the inevitable failure of the campaign which is now being waged to reconvert the fleet to a coal-burning basis?

New Canadian Destroyers

London *Times,* May 14.—The two destroyers building in this country for the Royal Canadian Navy, to replace the *Champlain* and *Vancouver,* are nearing completion. The *Saguenay* will probably leave the Thornycroft works, near Southampton, on May 26, and commission at Portsmouth next day for service. The *Skeena* will probably follow her on June 10 and commission on June 11. Both will be commanded by Canadian officers, the *Saguenay* by Lieutenant Commander A. M. Hope, who has specialized in gunnery since the war; and the *Skeena* by Lieutenant K. F. Adams, who has recently been serving on the *Calypso* in the Third Cruiser Squadron, Mediterranean.

FRANCE

Ajaccio

Naval and Military Record, April 22.—The city of Ajaccio has become a naval point *d'appui* of growing strategic importance as the consequence of the sensational rise of Italian sea power and ambitions. The Italian feverish organization of Sardinia, with a view to ready offensive against French trans-Mediterranean convoys, has for natural counterpart wide-range defense preparations in Corsica. Ajaccio roadstead is well suited for both offensive and defensive purposes: geographically, it controls the approaches to both Toulon and Genoa from the the west. It is wide, easy of access, and deep, while being well sheltered, nautically speaking, as well as against attacks from the high sea and from the air, and the French Admiralty could not remain deaf to the urgent request of the patriotic islanders for adequate defenses. Long-range batteries, without mentioning mobile artillery groups on trucks, and seaplane escadrilles command the approaches to the Bay of Ajaccio, that is besides the weekly rendezvous of destroyer, submarine, and seaplane flotillas. Corsica, always important in the past, sees its strategic value further increased by new developments.

Antiaircraft Defense

Naval and Military Record, April 22.—The danger of aërial attacks has been shown by Ingenieur-en-Chef Rougeron to be much greater than is officially admitted in Paris Admiralty quarters. French post-war cruisers are much inferior to their Italian and English rivals in the matter of antiaërial armament and protection. The 7,500-ton *Duguay-Trouins,* for instance, only carry four 3-inch quick-firers, whereas the new Italian 5,300-ton *Giussianos* mount six A.A. 4-inch weapons. The French 10,000-ton cruisers carry eight 75 or 90 mil. quick-firers in addition to eight A.A. one-pounders. Such an armament, in the opinion of the able French expert, is inadequate to cope with the novel conditions of aërial attacks. Seaplanes are increasing in size, getting armored, and designed for fighting at great altitudes, at which they will be relatively proof against small missiles. There is a good point in the number of A.A. guns on board the latest *croiseurs légers* of the French Navy, for massed air attacks must be expected, but range is the main thing if armored enemy squadrons of the air are to be destroyed before the possibility of their working mischief. The Italian Navy more than any other bestowed attention on the air problem. The A.A. armament of Italian 10,000-ton cruisers comprises eight 4-inch quick-firers, besides ten weapons of smaller caliber and eight machine guns. The *Algerie,* now building at Brest, and the new *croiseurs légers* will have numerous 4-inch A.A. guns.

Landing Operations

Naval and Military Record, May 13.—The science of landing is being studied with particular care by Admiral de Laborde. No student of naval affairs at all familiar with the disastrous failure of the Dardanelles landing operations and its causes will think of denying the importance of the question. For many reasons landings will play a still greater rôle in the wars of tomorrow. If the Dardanelles landing enterprise had been tackled with the methods, both cautious and daring, being weekly applied in the *Deuxième Escadre,* success would have crowned the gallant efforts of the allies (mostly of the British), and the course of the war would have been still more favorable to the cause of right and justice. On January 13 a landing was effected at Penfret, under cover of gunfire and of seaplane bombs, but under doubtful conditions, with estimated great losses due to submarine attacks by the defenders. On March 18 a landing was effected by surprise at dawn on Quiberon Beach, close to Penthievre Fort—quick, smart work, satisfactory test of new landing appliances and kit; artificial fog in use to screen and blind fort, rendered possible by fine weather. Other landing attempts took place in April. The beginning of May has been marked by two landings at Quiberon and at Etel (Morbihan). For the first time an armored amphibian tank (Renault, thirteen tons) was put ashore, giving an idea of the novel aspect of the landings of tomorrow. Special vessels, inspired from ferryboats, may be constructed for the transportation and landing of these new machines (that would have done wonders in Suvla Bay and in other parts of the Dardanelles Peninsula to minimize losses). Many officers favor the German type of armored amphibian vedettes (good for 10 knots at sea and 16 miles on land) as being more practicable for quick and safe landing. They are to be tested. Future landings are certain to be operated with machines of both types: thus interesting problems are in store.

Armament Limitation Accords Uneconomical

Naval and Military Record, May 6.—By J. B. Gautreau. The lack of wisdom and uneconomical character of those unending armament limitation arrangements are being illustrated by the premature discarding of the fine British 28,000-ton battle cruiser *Tiger.* Paris critics remark that neither the French nor the Italian Navy possess a single ship of such all-round efficiency for the purposes of strategic warfare, especially against the new German pocket battleships. The *Tiger,* under rational conditions, deserves to be credited with easily five more years' useful fighting life. The "Imperialistic" Navy of France is keeping in service 23-year-old *cuirassés* adorned with five funnels and ridiculous appellations (*Voltaire, Diderot, Condorcet*) that are far from the worth of the *Tiger.* By thus shortening the useful life of warships, without in any way making war less probable, so-called peace and armament limitation conferences are bound in the end to much waste and to a considerable increase of military expenditure.

As a matter of fact, the international expenditure on armaments, which is today very much greater than it was before the great war, is the direct result of the suspicion, spirit of competition, and feeling of uneasiness bred by those dangerous public parleys round delicate questions of national *amourpropre* and susceptibilities over which formerly, and very rightly, a prudent silence was observed in diplomatic circles. The present Italian naval megalomania and avowed bid for the mastery of the Mediterranean (*mare nostrum*) is to be traced to the 1921 Washington farce. M. Briand thought that by accepting parity for battleships with Italy he was getting out of a diplomatic corner, giving our *soeur latine* mere paper satisfaction, and making a concession that would be final, whereas that original climbing down has been the source of the unending difficulties with which our peace-loving republic is faced. As M. Leygues, the creator of the post-war French Navy, remarked: "There is no finality on the road to concessions: the more we give of our obvious rights and guarantees of security and the more we are being requested to give, France will never be weak and powerless enough for her neighbors. It is high time to say 'No!' and to recover the use of our national independence." The misfortune is that it would have been more easy and natural to say "No" in 1921. As the result of M. Briand's policy, France has come down so much in the estimation of others that pretense on her part at this stage, at managing her own affairs is likely to be looked upon as a piece of intolerable impudence and to produce a stupe-

faction and indignation similar to that felt by the board of the English workhouse when poor Oliver ventured "to ask for more."

The most glaring demonstration of the futility of the whole armament limitation business is to be found in the expenditure entailed by the much limited Imperial Navy of Germany. The 10,000-ton *Ersatz Preussen*, to be launched (virtually ready) on May 19, represents the price of two-and-a-half French 10,000-ton *croiseurs légers*, and her ballistic superiority is on a corresponding scale.

America and Armaments

Naval and Military Record, May 13.—By J. B. Gautreau.—President Hoover's eloquent and heartfelt appeal in favor of all-round disarmament has been received with pleasure and respect in Paris. France would welcome the suppression of all armies and navies, peace and treaties to be guaranteed by an international police force. Paris journals note with envy the privileged situation of America, that could do away with the whole of her naval and military force without by so doing courting invasion and disaster. France, having been invaded and devastated several times within a century for the sole crime of being caught napping, has to take a different view of the matter. It is further noted that the recent Toulon aërial exercises are mere child's play compared with the 672 planes and the 1,700 officers and men to take a part in the grand aërial maneuvers this month in American waters. What justifies armaments is the consideration of vulnerability, dangers, and security.

JAPAN

New Cruisers

London *Times*, April 20.—With the launch on April 5 of the *Chokai*, Japan has in the water her full quota of 8-inch gun cruisers allowed under the London treaty. In the treaty all cruisers are divided into two subcategories, "A" with guns over 6.1-inch, and "B" with guns under this caliber. Of the former, Japan is allowed 108,400 tons. Her first four 8-inch gun cruisers, laid down in 1923-24, were of 7,100 tons, and therefore aggregate 28,400 tons. In 1924-28 she laid down eight of 10,000 tons, of which the *Chokai* is the last to go afloat. Japan has now no cruisers in her building yards. Although she may not build any more 8-inch vessels, she will require to build a number of 6-inch ships, as well as destroyers and submarines, for replacement purposes. In the new issue of Brassey's *Naval and Shipping Annual*, Captain Edward Altham, C.B., R.N., states that "the design of the new 6-inch cruisers is likely to give rise to considerable controversy, and will probably be influenced by new construction in other navies. In spite of many and varying reports, no authentic details are yet available regarding such ships." It is believed that the new Japanese cruisers will be of 8,500 tons.

RUSSIA

Submarine Sinks in Baltic Sea

New York *Times*, May 27.—It was disclosed tonight that disaster had overtaken Submarine 9 of the Russian Baltic fleet, which failed to emerge after making a dive while exercising with other vessels of the fleet last Friday.

After the mishap was reported, two planes and other submarines in the neighborhood were sent to the vicinity. They found only pools of oil on the surface.

Auxiliary ships later were sent out but their efforts to raise the vessel have been unsuccessful. Destroyers are constantly on duty at the scene.

An Exchange Telegraph dispatch from Riga, Latvia, shortly before midnight tonight located the sinking Russian submarine at Lat. 59 deg. N., and Long. 24 deg. E., where the depth was said to be about sixty fathoms.

The dispatch said that it was understood the catastrophe was the result of an explosion.

The location of the submarine, according to the Exchange Telegraph dispatch, indicates that it sank in the Gulf of Finland, less than 100 miles from Helsingfors.

Although available records do not give the exact strength of the Russian Baltic fleet, there are believed to be approximately eight submarines attached to this unit. There also are about a dozen destroyers and three battleships.

The Russian Navy also keeps a number of fighting ships in the Black Sea.

GERMANY

Launch at Kiel

London *Times*, May 18.—From our naval correspondent. The launch at Kiel tomorrow of the first battleship to be built for Germany since the war is an important event not only for her Navy but for naval officers and architects all over the world. A new epoch in warship construction may be said to be opened by it. The peculiarity of the design is such that, while in Germany it is defended as the natural and inevitable outcome of the need of an up-to-date type capable of performing essential military duties, elsewhere it is regarded as a challenge which must provoke answers from other navies and thus lead to a new phase in armament competition. This, notwithstanding the fact that the Versailles Treaty definitely limited the size of such a ship, the caliber of her guns, and the number which may be built. Of course, rivalry may go on in other directions besides tonnage, guns, and numbers of vessels. Germany is seeking to take advantage of the latest developments in science and engineering to produce, on a limited displacement, a ship which shall outclass any yet built.

At the peace in 1919, she was left with but the oldest remnant of her war fleet. It included eight battleships (completed 1904-08), eight light cruisers (1899-1905), sixteen destroyers, and sixteen torpedo boats, but no submarines. The replacement of units within these numbers was permitted, but the new vessels were not to exceed the following dimensions:—Armored ships, 10,000 tons, light cruisers, 6,000 tons; destroyers, 800 tons; torpedo boats, 200 tons. The post-war German authorities considered that their cruiser material was in the worst condition, and when replacements came to be approved in 1920 cruisers were built first. Commander von Baumbach, of the German Navy, in an article in the current issue of Brassey's *Naval and Shipping Annual*, written with official permission, recalls the somewhat anomalous situation which existed at that time. Two of the eight cruisers retained at the peace were already due for replacement, and the German representatives proposed to the Inter-Allied Commission of Control that they should complete two half-built cruisers of the war program then in their yards. This was refused, so that when, in 1921, the partially built *Leipzig* was being broken up at Wilhelmshaven under the treaty, on a slip near by a new ship of identical type, the *Emden*, was being constructed. He adds: "There was the same contradictory position in respect to battleships. If in 1919 the Entente Powers had allowed Germany to keep and use several ships of the *Ostfriesland* or *Nassau* class—which were then in German possession—there would have been no need to replace any vessel until the year 1940." The cruiser *Emden*, completed in 1925, has been followed by the *Konigsberg*, *Karlsruhe*, *Köln*, and *Leipzig*, so that five of the eight German cruisers are new. In 1925 a start was made with the building of destroyers, and twelve are now completed.

The building of a new armored ship was approved in 1928, and the *Ersatz Preussen*, as she has been known hitherto, was laid down in the same year. She is expected to be called the *Deutschland*, and to be ready for service in 1932. In her design, by utilizing every device for saving weight, such as welding instead of riveting, the German naval architects have produced a vessel which they claim is superior in all-round battleworthiness to any other ship of similar tonnage. She has a length of about 590 ft., beam of 67.5 ft., and draught of about 19 ft. There is an armor belt amidships incorporated as part of the hull, and two protective decks. The vessel will be the first armored ship in the world to be driven by motor engines, and is expected to have a radius of action of more than 10,000 miles at a speed of 20 knots. Her propelling machinery consists of eight M.A.N. double-acting two-stroke engines, with a total shaft horsepower of 54,000, the designed maximum speed being 26 knots. The reliability and durability of such engines, compared with steam machinery is a subject of much discussion. The armament will include six new model Krupp 11-inch guns, firing 670 lb. projectiles at a range of 30,000 yards, with an elevation of 60 deg., at which elevation the main armament might be used against air attack. There are also eight 5.9 in. and four 3 in. (A.A.) guns, and six 19.7 in. above water torpedo tubes.

The characteristics of the *Deutschland* have been the subject of much controversy, particularly as she happens to be the most formidable ship of war building in any country at present. American Navy Department engineers, in their official *Bulletin*, have advanced the view that she may eventually necessitate some revision of the naval limitation treaty rules governing ship design, as she is "a nondescript type, combining in some degree the offensive and defensive powers of a capital ship with the speed and sea-keeping endurance of a cruiser." She is fast enough to decline action with any existing capital ships, most of which have a maximum speed of 23 knots, but she is also strong enough to destroy any existing cruiser, the armaments in which class are limited by the Washington and London treaties to 8- or 6-inch guns.

The German replacement program provides for the laying down of three more similar ships in 1931, 1932, and 1934, so that by the time the London Naval Treaty expires at the end of 1936 a squadron of fast 11-inch battleships may be in the water. So far as this country is concerned, no reply can be made to this challenge until after the naval conference of 1935. The French government has already tabled a program for new armored ships, and in the proposed agreement between France and Italy each power may respectively complete two capital ships, the displacement of each of which will not exceed 23,333 tons and the gun caliber 12 inches. Although these would show an appreciable reduction on ships allowed by the Washington treaty, they would be more than twice the tonnage of the new German vessel.

MERCHANT MARINE

Forty Per Cent of Our Cargo Home-Borne in 1930

New York *Times,* May 25.—More than 40,000,000 tons of freight were carried between United States and foreign ports in American-flag vessels during the fiscal year 1930, according to the results of a study made by the Shipping Board Bureau of Research announced yesterday. The report showed that nearly 60,000 entrances and clearances were made at United States ports during that period and that of this number 41.4 per cent were American ships, while of 104,670,487 tons of cargo carried to or from our ports by vessels of all flags, about 42.2 per cent was carried in American bottoms.

The vessels engaged in carrying the foreign trade have been segregated into five general groups or classes: Combination passenger and freight boats, freighters, tankers, sailing vessels and miscellaneous, including barges, scows, and tugs.

The combination passenger and freight ships included all vessels with accommodations for more than sixteen passengers. Vessels of this type made 32 per cent of the entrances and clearances, carrying 8,152,464 tons, or 8 per cent of the freight volume.

The freighters made 50 per cent of the entrances and clearances and carried 63,265,591 tons of freight, or more than 60 per cent of the total cargo.

Tankers designed for carrying liquid or semiliquid cargoes in bulk, such as petroleum products and molasses, made 12 per cent of the entrances and clearances and carried 31,703,619 tons, or more than 30 per cent of the total water-borne freight.

Sailing vessels engaged in our foreign trade made about 2 per cent of the total entrances and clearances and carried 668,815 tons, or less than 1 per cent of the total freight.

A limited number of the vessels of the combination passenger and freight type and the freighter group were equipped with refrigerated space for carrying perishable cargoes. Vessels of the combination type so equipped made 778 of the entrances and clearances reported for that group, carrying 780,867 tons of cargo. Freighters with 50 per cent or more of their cargo space refrigerated, made 552 entrances and clearances and carried 555,428 tons of cargo.

Navy Department Allocates Ship

Marine Journal, May 1.—Under date of March 25, 1931, Governor Franklin D. Roosevelt wrote to the Honorable Charles Francis Adams, Secretary of the Navy, that the state of New York, being anxious to provide better training facilities for the young men enrolled in the New York State Merchant Marine Academy was very greatly handicapped because the training ship *Newport* was inadequate. Therefore, the Governor requested that the U.S.S. *Procyon* with complete equipment be loaned to the state of New York for use as the training ship of the New York State Merchant Marine Academy to replace the *Newport.* The Secretary of the Navy, under date of April 3, advised Governor Roosevelt that the department would be able to comply with the request, and further that when recommissioned, the name would be changed to the U.S.S. *Empire State.*

The acquisition of the U.S.S. *Empire State* for the training of merchant marine officers will be widely acclaimed. The consensus of opinion in maritime circles has been for a training ship which would combine cargo and passenger carrying characteristics. The new vessel will fulfill the requirement and for the first time in the history of training merchant marine officers, cadets will be trained on a modern ship with all modern equipment. Cadets from states other than New York state who enter the academy will be required to pay approximately $750 per annum for tuition and board, plus $90 per annum for uniforms, textbooks, and minor equipment. The course at the academy is two years and the cadets successfully completing the course are graduated and licensed as third mate or third assistant engineer, and obtain immediate employment. The educational qualifications for admission to the academy require the candidate to have completed three years of high school work, and a large percentage of those at present enrolled are high school graduates.

ENGINEERING AND RADIO

Giant X-ray Tube Has Record Power

New York *Times,* May 16.—The new Coolidge 900,000-volt X-ray tube, in which flying electrons are discharged at a speed of 184,000 miles per second, and equivalent to enormous amounts of radium, 99 per cent

the speed of light, will be shipped from the General Electric laboratories here next week to Memorial Hospital, New York, for use in treatment of cancer, it was announced here today, by Dr. W. D. Coolidge, associate director of the laboratories.

The tube was assembled while the General Electric Company played host to 412 business and professional men, members and guests of the New York Electrical Society and the Illuminating Engineers' Society, who jointly celebrated their golden and silver anniversaries, respectively.

The tube is to be the largest used so far in any hospital for therapeutic treatment. The average voltage of present-day X-ray tubes ranges from 200,000 to 300,000 volts. It consists of a double tube 12 feet 3 inches long and 20 inches in diameter. The source of its high voltage is an induction coil stepped up from an alternating current circuit of 1,100 volts in two stages of 450,000 volts each.

The high-voltage wire is taken to a spherical electrode of brass, inside of which is placed a 12-volt storage battery of four amperes for supplying the current to the filament that liberates the electrons.

The electrons are then passed through a hole in a doughnut-shaped metal shield. This first bends them into a concentrated beam, which becomes more divergent after passing through the field.

The first stage anode is a long, hollow, heavy copper tube, through which the electrons fly after being given a high velocity by 450,000 volts. As they pass out of this tube they come within the influence of the second 450,000 volts which "steps them up" to the velocity of 99 per cent of that of light, the latter being the highest speed possible in nature, at which mass becomes theoretically infinite.

The X-rays produced, said Dr. Coolidge, represent only two-tenths of 1 per cent of the energy flowing between the cathode and the target. The remaining 99 8-10 per cent is lost in the form of heat.

Still the X-ray produced goes through a protective layer of copper 3 millimeters thick, then through 4 inches of iron, and retains sufficient power to take an X-ray picture.

Automatic Radio As Lifeboat Equipment

Bulletin of Engineering Information, June 1.—Additional applications of the radio as a means of protecting life at sea are evidenced in the announcement made by the Federal radio commissioner Harold A. Lafount that the new Dollar liner *President Hoover,* recently launched at Newport News, Va., will carry thirty-two lifeboats, all of which will be equipped with automatic radio transmitters.

A hand-driven generator will supply the current for the sending machine which mechanically produces the radio call letters "S.O.S." on the international distress frequency of 500 kilocycles. In addition the generator supplies current for a flickering beam of light so that vessels within hearing can determine the location of the craft through radiocompass bearings and when within close proximity by the light beam direct. The normal service range of the transmitter is reported at 100 miles.

Tungsten Plate

New York *Times,* May 24.—Tungsten plate, a dream of the electro-chemist for more than sixty years, can now be made through a new electroplating process discovered by Professor Colin G. Fink of the Electro-Chemical Department of Columbia University, he announced yesterday.

The new plate, displayed by Professor Fink in his laboratory, gives the appearance of being even whiter than silver, for, unlike silver, it does not tarnish when exposed to the air. In addition tungsten is one of the hardest of metals, with a melting point of 8,000 degrees Fahrenheit, more than twice that of chromium. Unlike other metals used for plating, it is insoluble in the strongest acids.

It was pointed out that if household utensils made of tungsten plate should come into common use it would bring to an end the polishing labors of the housewife, as the metal is immune not only to tarnishing but to the discoloration from the acids in foods. Plated on aluminum, it was stated, an article of great lightness and durability could be produced for household use.

Tungsten plate, however, is likely to be used most widely in industries depending on chemical processes where resistance to heat and acid is important. Its hardness, good heat conductivity and high melting point make it particularly suitable for electrical contacts and arc points subject to great temperature changes.

A piece of brass which Professor Fink

had plated with a tungsten alloy was not noticeably attacked by hydrochloric acid in a week. A coating of any other common metal of equal thickness, Professor Fink pointed out, would have had a life of seconds, rather than of hours, under similar conditions.

The first attempts to plate tungsten were made by a German chemist, Zettnow, in 1867. He used a bath of molten sodium tungsten, and succeeded in obtaining a tungsten oxide by electrolysis, but failed to make pure tungsten.

The electro-deposition of metallic tungsten has been attempted since then by many investigators, both in this country and in Germany, but up to the present time no method had been found which would give the consistent results necessary for commercial success. Professor Fink, who is also the originator of the ductile tungsten lamp filament, has been working on the problem for almost twenty-five years.

"A comparison of tungsten with other metals," said Professor Fink, "shows the desirability of a tungsten coating. Cadmium, silver, and nickel are all duller and have a much lower melting point. Chromium is almost equally bright, but it melts at a much lower temperature, and is soluble in hydrochloric acid."

Professor Fink's process involves the passing of an electric current through a water solution of sodium tungstate. Deposits of metallic tungsten were successfully produced on a variety of metals, including brass, copper, zinc, iron, and carbon. The tungsten deposit, it was said, was smooth, hard, and coherent, having a high luster.

Chromium plating, which has had remarkable success because it is decorative and offers efficient protection against atmospheric corrosion, was also developed in the Columbia laboratories by Dr. Fink in 1922.

Motor Boat Speed Record

The Engineer, April 10.—In a Journal note on Friday, March 27, we recorded the fact that the American Commodore Gar Wood was the first man officially to reach the speed of 100 m.p.h. on water when he raised the record speed to 102.155 m.p.h. Last Thursday, Kaye Don won the record back for England by driving Lord Wakefield's boat *Miss England II* at 103.49 m.p.h. His attempt on the record was made on the Parana River, at a point some two hours' journey from Buenos Aires. As no means of communication between the chosen course and the town existed, the public had to rely on information received by the wireless installations of the gunboats lying in the river. A number of trial runs in the morning were not highly successful, but after luncheon the engine was re-tuned, and Kaye Don made a dash downstream first and later upstream, and an average speed of 103.49 m.p.h. was attained. As a consequence of this successful attempt, Britain now holds the speed records for air, land, and water. In the air, Squadron Leader Orlebar achieved a velocity of 357.7 m.p.h. soon after the Schneider trophy race in September, 1929, and Sir Malcolm Campbell, improving upon Sir Henry Segrave's record, raised the land speed to 247.736 m.p.h. at Daytona last February.

Full-Sized Planes "Fly" in Wind Tunnel

New York *Times,* May 28.—Inspection and dedication of two of the largest units of equipment for aëronautical research in the world were the outstanding events of the annual meeting today of the National Advisory Committee for Aëronautics.

These are a wind tunnel for full-sized planes through which a blast of 115 miles an hour can be whirled and a fully enclosed concrete seaplane channel more than a half-mile long. The latter is covered with sheet metal in such a way as to keep out air currents which would prevent accurate measurements of the action of variously shaped seaplane pontoons and hulls when traveling through the water.

Along the channel lies a track on which runs an electrically operated carriage at speeds up to sixty miles an hour. This whisks the floats or seaplane models through water while instruments record every movement.

Eight thousand horsepower is needed to whirl the great fan blades in the wind tunnel. The mouth of the tunnel is 30 by 60 feet. The gale races across an airplane on a high stand and into another yawning mouth of the same size. Then it is carried through an overhead tunnel back to the fans and again set along on its furious journey.

The building which houses the tunnel is 224 by 434 feet and stands 100 feet high. The unit cost $1,000,000.

A Vought Corsair naval fighting plane was mounted on the test stand for the demonstra-

tion today. It performed just as if it were in actual flight.

Experiments with a heavy plane equipped with wide landing gear and shock absorbers having an unusually long "travel" have proved that safety will be increased on large air liners, the visitors were told at the morning conference.

A heater to prevent formation of ice on the wings was shown. A small boiler is placed on the exhaust of the engine, with steam pipes running to different parts of the leading edge of the wing.

Dr. Joseph S. Ames, president of Johns Hopkins University and chairman of the national advisory committee, presided at the conferences and explained many of the laboratory instruments.

AVIATION

The 1931 Coast Defense Air Exercises

National Aëronautic Magazine, May.—By the Honorable F. Trubee Davison. In assembling 672 planes, covering all military types, in one division to be flown under one command and over a territory that extends over more than a dozen states, the Army Air Corps has undertaken one of the most ambitious and significant efforts in the annals of aviation in the United States.

The 1931 coast defense exercises, to be launched by the Air Corps at Dayton, Ohio, on May 15 and continuing until May 30 when they terminate at Washington, D.C., afford an exacting and efficient test of the flying ability of Army personnel, reliability of equipment, efficiency of ground maintenance system, adequacy of airports, mobility of huge air units and, last but not least, the tactical methods developed by the Army in building up its coast defenses in event of war.

A clear conception of the tremendous scope of the 1931 exercises may be had from the fact that, from the time the various squadrons, groups and wings leave their stations, until they return after the air division has been mobilized, Army fliers will have covered more than 10,000,000 man-miles—a considerable volume of flying, even for these days.

Inasmuch as the entire division of 672 planes will visit or fly over most of the populous centers along the Atlantic seaboard from Virginia to Massachusetts and by virtue of the fact that some seventy other cities will be covered by various Air Corps units in going to or coming from the field exercises, there is ample opportunity for every air- and defense-minded person to take a first-hand inventory of the progress of Army aviation.

While the chief purpose of the exercises is to train the different combat branches such as pursuit, bombardment, and attack in the highly essential field of teamwork and to test our various tactical theories particularly with respect to coast defense, the 1931 demonstrations should provide a strong and desirable stimulus to general public interest in aviation. Not alone with respect to making the average person realize that human flight has been brought to a point that rapidly approaches perfection from the standpoint of the airplane as a swift and sure means of communication, but also in regard to the development of municipal airports as links in a system of airways which would be as valuable for national protection in time of war as they are to the nation's commerce in time of peace.

Aviation is out of its cradle stage but it has not as yet attained its full growth. This applies not alone to commercial aëronautics but to military aviation as well. From design and engineering standpoints Army aviation is making real progress. So far as the quality of equipment is concerned, the Army Air Corps has reason to be proud of its accomplishments. As for quantity, we are catching up as rapidly as we can. One thing I would like to stress is that the air armada of 672 planes does not represent the actual fighting strength of the Air Corps. Only about 450 planes in the division are fighting planes in the true sense of the word. In fact, in order to simulate an emergency we have brought in Air Corps cadets from Kelly Field.

As time goes on, the various combat units will be expanded in conformance with the policy laid down in the five year Army Air Corps development program adopted in 1926. Meanwhile, the War Department and the Army Air Corps are doing all within their power to increase and improve the tactical value of Army aviation as a factor for any prospective enemy to reckon with.

Aircraft Carriers

Army, Navy, and Air Force Gazette, April 30.—A very interesting and practical subject has been set for the essays for the

Henry Leigh Carslake prize for observers in the Fleet Air Arm next year. The competitors are asked to discuss the advantages and disadvantages of small aircraft carriers (10,000 tons or less) as compared with large carriers (20,000 tons or over). At present all the carriers in use in the Royal Navy are over 20,000 tons, with the exception of the little war-time *Ark Royal*, which is now only used for catapult experiments.* The Australian Navy has a small carrier, the *Albatross*, of 5,000 tons, with accommodation for nine seaplanes. The tendency in other countries is all towards smaller carriers, probably on the grounds that the larger vessels are costly to maintain and concentrate too many eggs in one basket. The limit of size was reached by the 33,000-ton *Lexington* and *Saratoga*, in the United States Navy, which are reputed to be able to carry 120 planes each. In the new carrier, the U.S.S. *Ranger*, the displacement has been kept at 13,800 tons, with a capacity for 76 planes; and in Japan the *Ryujo*, which was launched at Yokohama on April 2, is of 7,600 tons, as compared with the 26,900 tons of the *Kaga* and *Akagi*, completed in 1927-8. So, too, in France, the *Béarn*, of 22,146 tons, is being followed by the *Commandant Teste*, of 10,000 tons, although it would appear that the latter is intended to work less on her own than as a tender to the *Béarn* and to act as a reserve for cruisers carrying aircraft.

*NOTE: An error: British aircraft carriers range in tonnage from the *Hermes* (approximately 11,000 tons), to the *Eagle*, 22,600 tons.

Electric Weather Maps for Aviators

New York *Times*, May 24.—An experimental electric weather map which indicates conditions along given routes at a glance, thereby saving the pilot ready for a cross-country jaunt worry and trouble in choosing the best course, has been designed by Lieutenant J. B. Anderson, U. S. Navy, meteorological officer at the Anacostia Air Station.

Tests have been conducted successfully for several weeks, and two identical maps have followed the first device. One is located in the commanding officer's office, another in the pilot-room and the third, which controls the three maps, is situated in the meteorological room. All three are worked simultaneously.

In general appearance, the electrical map is an ordinary chart of the United States extending from the Middle West to the Atlantic seaboard. A large map of the entire country could be arranged, but for experimental purposes only a small section has been drawn on the board.

Tiny lights showing white, green, and red dot the ordinary routes extending from Washington to other sections. White indicates good flying weather; green means that undesirable conditons will confront the pilot; red shows storms, heavy fogs and gale winds, and means that under no conditions must a pilot attempt to fly over that particular area. Two different colored lights indicate that weather conditions are expected to change, and electric bells tinkle to call attention to the shifting colors. Prolonged rings warn of squalls, thunderstorms, or line storms.

The usual procedure followed by a pilot preparing to leave a military air station consists first in obtaining a trip map of the route to be followed. On a huge board in the operations room there are marked the names of the various military fields of the country, and under them are marked in chalk the flying conditions at that particular field, velocity and direction of winds at various altitudes and visibility obtaining at the time the report was received. These reports are received every few hours, but it is left to the pilot to interpret changing conditions over the route he expects to fly.

Thus great saving of time and greater reliability are afforded by the electric map. The shining lights instantaneously show the pilot just what he may expect, whether conditons are changing and where he should begin a detour in order to escape bad conditions if his mission is urgent.

The Navy Department is enthusiastic about the new device and plans are under way to have similar maps installed at the Naval Air Station at Hampton Roads and at San Diego. Very likely, too, it will soon find its way to commercial airports.

Weather reports are constantly coming into the naval station by radio, telephone, teletype, and arriving fliers. They are used to keep the electric map up to the minute. When a report becomes two hours old the lights are turned off.

Panels along one side of the map show the force of winds at stations throughout

the country. But the electrical system tells the flier just what he must know. Winds may retard or increase his speed and for that reason such knowledge is helpful. It is gained at a glance if the route is open.

Patrol Plane Tenders

Bureau of Aëronautics, Navy Department, May 15.—The evolution of the patrol-boat type of seaplane has progressed to the point where seaworthiness, performance, and habitability make it possible to consider the squadron of this type mobile units, capable of extended operations with the fleet. In conformance with this viewpoint operating squadrons at Coco Solo and Pearl Harbor have been attached to their respective fleets with the expectation that these units will fulfill the promise of an extremely valuable distant patrol arm, given by the satisfactory operation of patrol units in the recent problems of Panama.

It has been evident for sometime that the full usefulness of these squadrons could not be realized until efficient and suitable surface craft were made available as tenders. Until recently the bureau's efforts in this direction did not meet with full success. Recently, however, the approval of the secretary has been given to the necessary work to provide a satisfactory number of vessels with fueling, lifting, and other gear that will make them suitable as seaplane tenders.

For this tender duty, seven mine sweepers of the bird class: namely, *Sandpiper, Teal, Gannet, Swan, Pelican, Avocet* and *Heron* have been designated. Gear that would interfere with this duty such as towing engines, mine tracks, etc., will be removed. Fuel tanks' capacity ranging from 8,000 to 12,000 gallons and oil stowage capacity of 800 gallons will be installed. Lifting gear of 20,000-pound capacity will be provided, as will also a seaplane cradle on the fantail. Also additional quarters for personnel will be constructed.

Better facilities for this duty will also be provided for the *Argonne* and *Oglala.* Each of these vessels will receive, with 10,000 gallons fuel tankage, 20,000 pounds lifting gear and seaplane cradles, together with the necessary fire extinguishing installation.

To supplement the above tenders, the oilers, *Cuyama, Brazos,* and *Neches* will be provided with fuel pumps and piping that will make possible the fueling of patrol planes astern at sea.

It is the department's present plan to complete these installations prior to the next concentration in Hawaiian waters.

Airplane Design in Relation to Tactical Requirements

(Extract from paper, presented by Mr. Temple N. Joyce, Vice-President and General Manager of B. J. Aircraft Corporation, at national aëronautical meeting, Baltimore, May 12.)—The first thing a designer is interested in when considering an experimental airplane in a given class is the performance desired. Of course, if unlimited money is available the tactical man would advise that there be three or four types of performance desirable in the fighter or pursuit class, two in the observation, two in bombardments, possibly two in attack, one in scouting, two in dive bombing, and one in patrol.

Naturally, the thing most desired in any aircraft is speed, and this is only sacrificed as a last resort. In practically every instance some other characteristic of the plane is sacrificed in order to maintain a higher top speed; gun power is reduced, landing speed increased, ceiling and take-off penalized, as well as endurance, and even maneuverability and load factors in some instances. Unquestionably, a plane of superior speed can outfight one of superior maneuverability, all other things being equal, because a speed plane can choose its time of attack. The type of plane necessary to give maximum speed will vary to a certain extent, between wide limits, depending upon whether speed is desired at sea level or high altitudes. If vertical diving requirements enter the picture, then other serious compromises present themselves. If maneuverability at altitude, together with high rate of climb, is desired, a relatively light wing loaded airplane results, with slow landing speed and relatively slow performance close to the ground. Another type of high altitude airplane would be one with very low weight per horsepower, supercharged, that would be carried along by sheer horsepower. This plane would depend solely upon its high speed for a surprise attack and under no conditions accept combat with the slower speed and sharper turning radius type, as previously mentioned. Another type for low altitude work might consist of a plane with a high

wing loading and a correspondingly high landing speed, low weight per horsepower, and with unsupercharged engine, whose speed would be extremely high when operating under 10,000 feet. If diving requirements with sharp pullout are required in either of the fast types there is no question but that the performance all-around will suffer, due to the additional strength requirements. In the United States today none of our single seaters are in the classifications above. They employ supercharged engines to give them performance at altitudes with a relatively large wing area to give them maneuverability at altitude, and at the same time, load factors of twelve are imposed to take care of diving tactics. In fact, this airplane is our fastest type and is regarded as an all-round, general-utility, pursuit, even to the point of carrying bombs. To summarize, four types of single seaters might be expected in the future. First, an extremely fast, low altitude plane with unsupercharged engine, high wing loading, low power loading, and probably carrying only one gun with limited amount of ammunition, of a type similar to the Schneider cup racers. Imagine a squadron of either land or seaplanes of this type, having a horizontal speed greater than the diving speed of any of our existing types, manned by the picked pilots of the service, and operating out of a large airdrome, river, or lake adjacent to a zone of action. These planes could carry out long and short range reconnaissance, slow down to stalling speed during the observation time, and if attacked, open up and draw away from any of our present type, even if the latter had the additional speed of a dive. Possibly this is a radical picture; but a slight modification to permit slower landing is not an improbable conception.

Second, the same plane with supercharged engine and a small increase in wing area for high speed at altitude, using more or less the same offensive tactics in that it would only carry home surprise attacks, never staying to combat after the first firing.

Third, our present general utility type with maximum performance at approximately 5,000 to 10,000 feet, high load factors for diving and quick pull-out and provision for carrying a small bomb load.

Fourth, a highly maneuverable, light wing loaded plane with supercharged engine capable of extreme altitude, but not necessarily used as such except as this characteristic is reflected in its ability to maneuver around 20,000 feet. It would also be able to surprise other types cruising at altitude by climbing up under them to deliver an attack.

In the two-seat pursuit class only one type can be seen at this time with possible modifications in the use of straight or supercharged engines.

If our military services expect to be ready to go into production on the best type suited to meet the competition of an enemy, we should have available, during peace times, at least one experimental squadron in each class ready to meet the particular war requirements. If we do not do this, and persist in buying large quantities of general utility planes with little or no thought of specialized types, we may find ourselves at war with a nation whose airplanes, at a given altitude, would be so superior to ours that we could not carry home an attack except when in a commanding position or with superior numbers.

United States and British Airship Policy

New York *Herald Tribune*, May 24.—Great Britain's recent decision to restrict its activities with lighter-than-air craft to experimental work has increased America's obligation to develop and prove the worth of airships, aviation leaders believe, and the chief burden falls on the Navy, where leadership in aircraft has been vested for several years in this country.

Although the Army has made use of observation balloons, Senator David A. Reed, of Pennsylvania, chairman of the Senate committee on military affairs, favors eliminating them for the sake of economy and leaving all lighter-than-air work to the Navy. This would effect a saving of $2,000,000 a year, he said recently after a conference with President Hoover.

"One thing the Army ought to do is get rid of its balloons," he said. "They have not accomplished anything. The Navy is doing it much better. Scott Field, Illinois, ought to be kept for heavier-than-air aviation."

The responsibility for carrying on in the lighter-than-air field has been accepted by Rear Admiral William A. Moffett, chief of the Navy Bureau of Aëronautics. Admiral Moffett regrets the decision of the British to

limit their part in aircraft work, but he believes it is due to financial reasons rather than lack of faith in airships. He said:

> That the British believe largely in airships is proved by the fact that they had the courage and vision to build two of 5,000,000 cubic feet, which at that time were much larger than any airships in the world; that they spent much money in erecting handling and terminal facilities in India and Egypt, also an expensive mooring mast in Canada.
>
> All of this was done, in spite of the fact that they had lost airships and that our ship, the *Shenandoah*, had been lost. As as result of the observation of the operation of the *Los Angeles* and the *Graf Zeppelin*, the Navy Department is proceeding with confidence with the construction of airships.

The 785-foot dirigible *Akron* will be ready for flight probably in August, and the Navy is drawing up plans for its operation with the United States Fleet to prove or disprove its value in naval warfare.

In this connection the finding of the British court of investigation into the destruction in France, October 5, of the *R-101*, in which forty-eight lives were lost, was cited to show that leaking gas, combined with adverse weather conditions rather than structural weakness, caused the crash. The court likewise rejected the theory that there was any failure in the control gear.

One of the chief problems the Navy has faced in the development of lighter-than-air craft has been that of mooring airships. In this phase of aviation the British took the lead in the post-war period with the construction of the mooring mast, but to the United States goes the credit for the development of the movable mooring mast now regarded as the most suitable device for anchoring dirigibles.

Four types of mooring masts have been evolved—the high permanent mast, the permanent stub mast, the mobile stub mast and the floating mast. The development of the rail type and crawler mast represent virtually the final step in the Navy's program for mechanical handling of airships undertaken at the time of the *Shenandoah's* construction, and all that remains is the perfection of existing machinery.

The Navy's West Coast Airship Base

Aero Digest, May.—Construction of the new lighter-than-air base at Sunnnyvale, California, which will involve a total expenditure of $5,000,000, will probably be started about the middle of summer, according to information recently announced by the Navy Department. Bids for the erection of the airship sheds, which will accommodate an airship with a capacity of 10,000,000 cubic feet, will be called for in about one month and specifications issued for the construction of other buildings at the base.

Negotiations for the 1,000 acres of land offered by the city of San Francisco are being carried on at present. Difficulties in searching of titles having been encountered, legal phases probably will extend the task of completing preliminary details for a few more weeks.

Construction of the airship shed is expected to take between fifteen and eighteen months, and the building should be ready for use by the time the second of the Navy's two new superdirigibles will have been completed by the Goodyear-Zeppelin Corporation.

The ground plan for the station has been worked out. However, actual design work on the other structures to be built at the station has not been started yet. Construction of the industrial buildings, sewerage, and water systems, and other facilities of the air station probably will not start until July 1, 1932.

MISCELLANEOUS

The National Defense Act in Operation

Military Engineer, May-June, 1931.—In the midst of a material and mechanistic age it is profitable and in a way inspiring for us to give some thought, each year, to the activities of the War Department other than its normal preoccupation with handling the regular Army.

With the month of June begins the field training provided annually, under the National Defense Act, for the civilian elements of the Army and the junior organizations on which these elements are based.

First in point of time will come the six-weeks' camps of the R.O.T.C., that corps of high school and college students, which enrolls about 114,000 men in 320 odd units at 228 institutions. Our government invests about $5,000,000 each year in R.O.T.C. training in the field and on the college campus. A year ago, forty-three Army posts held sixty-nine encampments for 6,600 R.O.T.C. trainees, these being restricted to members of the college classes that were to graduate twelve months later. Designed to provide new blood for the Officers' Reserve Corps

the R.O.T.C. supplies each year more than 5,000 reserve officers. Some soon drop out, but the preliminary training does its part toward preparing the new material. Regular Army personnel on this duty includes 800 officers, 18 warrant officers, and almost 1,000 enlisted men.

During the months of July, August, and September there will be held the annual camps for the National Guard, the Officers' Reserve Corps, and the youth enrolled for civilian military training.

The annual federal investment in the National Guard averages close to $33,000,000, this sum being supplemented by about $15,000,000 appropriated by the separate states. Of the federal appropriation, about $9,500,000 go toward paying for the annual two weeks of field training and the maintenance of camps held in every state. Enrolling 12,700 officers and close to 170,000 enlisted men (about 90 per cent of whom attend camp), the average cost per trainee of the National Guard to the federal treasury is approximately $180, and to the state treasuries about $83. On duty with the National Guard for instructorship purposes there are 471 officers and 585 enlisted men from the regular establishment.

Turning to the Officers' Reserve Corps, we have the following basic statistics bearing on an organization that is relied upon to serve both as a reservoir of officer material and of cadres around which new military units will be formed in war. The total enrollment on June 30, 1930, was approximately 113,500 officers, of whom 11,600 also held commissions in the National Guard. Of the remaining 102,000, a total of 22,393 (22 per cent) were given active training during the year, the great majority receiving this instruction at the annual camps. A federal investment of $6,400,000 is made annually in this activity, an average of around $286 per trainee. For duty, complete or partial, as instructors, there are employed 469 officers and 538 enlisted men of the regular forces. The O.R.C. is subject to heavy losses in personnel, but the enrollment is slowly increasing. Of the 100,000 reserve officers, 20,000 are now on the inactive list, i.e., not subject to active duty or promotion.

Another activity, representing a federal outlay of about $2,000,000 annually, is the Civilian Military Training Camps held under the jurisdiction of the various corps areas. Between fifty and sixty of these camps are provided each year, an average of approximately 37,000 young men receiving four weeks of elementary instruction. For this instructorship duty the regular establishment draws upon the group on reserve training.

Entirely aside from considerations of national defense, it may be noted that one of the outstanding advantages of the Civilian Military Training Camps is the improvement in physical condition brought to the trainees attending them. In some cases the first thorough medical examination ever experienced by the man is had at one of these camps. Teeth are examined, undernourished and diseased bodies receive attention, bad positions are corrected, and sound habits are started. It was not for nothing that we learned in 1917-18 that 25 per cent of our young men were physically unfit for Army field service.

To recapitulate the cost of military training given annually in our country to the non-professional elements composing the Army we have:

Cost of National Guard	Federal	$32,900,000
	State	15,100,000
Cost of R.O.T.C.		5,000,000
Cost of O.R.C.		6,400,000
Cost of C.M.T.C.		2,000,000
Total		$61,400,000

An item of $61,400,000 is a vast sum considered from an individual's point of view; regarded nationally it amounts to no more than about $1.44 per year or $0.12 per month from each wage earner normally employed in the United States.

The military training so briefly discussed herein would be worth what it costs and more even if it did nothing but serve as a periodic reminder to our people that each citizen owes something to his country besides the payment of taxes. Criticism there has been of our system. Doubtless this will continue since it cannot be expected that one nation will accept another's estimate of what is necessary for its own defense. As a people we are by no means above criticism, but those who predict our militarization plainly disregard our Anglo-Saxon heritage which leads us so definitely in the opposite direction. Our tendency has been to neglect the question of national protection until too late to make proper preparation.

NOTES ON INTERNATIONAL AFFAIRS

From May 4 to June 3

Prepared by Professor Allan Westcott, U. S. Naval Academy

INTERNATIONAL CONFERENCES

Austro-German Pact Goes to World Court.—After withstanding two days of sharp criticism in the pan-European union committee, the proposed Austro-German customs agreement on May 18 was brought before the League Council. Here, in the opinion of supporters of the league and World Court, a great victory was gained for these institutions when Austria and Germany, under strong pressure from the other powers, consented to submit the legal questions involved to the decision of the World Court. Briefly the issue is whether Austria in making such an agreement is not violating the peace treaty of St. Germain and the Austrian debt protocol of 1922, both of which enjoin her against any engagement "of a nature to compromise her independence," without the consent of the League Council. That the customs union will constitute such an engagement was formally argued by the French government in a memorandum 7,000 words long, which attacked the agreement from the historical and juridical standpoint, from the standpoint of its unfavorable effect on Austria herself, in its political aspects, and from the point of view of the methods used in reaching the accord.

The reference of the legal issues to the World Court was primarily of advantage as a postponement. The real test will come when the "advisory opinion" rendered by the court calls for a sacrifice of prestige by France or Germany, as the case may be. To forestall such a crisis by patching up some kind of compromise settlement will fully occupy the European chancelleries during the coming summer. Meantime, by his conciliatory attitude at Geneva, Foreign Minister Curtius has seriously weakened his own position and that of the Bruening cabinet in Germany. The *Deutsche Allgemeine Zeitung*, organ of bankers and industrialists and heretofore steadfast supporter of the Bruening government, came out after the Geneva decision with a demand for Curtius' retirement, on the ground that the prestige of the cabinet had suffered a staggering blow at Geneva, and that Dr. Curtius no longer had the authority to administer German foreign affairs. The question was raised whether Germany would not be in a better position outside the league.

French Counter-Proposals.—To offset the very concrete and troublesome proposal of an Austro-German *Zollverein*, Foreign Minister Briand brought to the May meeting of the pan-European committee a scheme for the economic reorganization of Europe on a grand scale. So far-reaching and grandiose were the proposals of the twenty-four-page French memorandum, and so hazy and remote of realization, that they had the effect of an immense smoke screen beclouding the issue. The French "constructive plan for European reorganization" proposed a radical extension of the seventy or more cartels or international trusts now in existence in Europe in order to control production and competition; a further effort to lower tariff barriers by international agreements; financial aid under league auspices, with solid backing from France; and in particular, a preferential tariff system of European powers who are the chief customers of Austria to aid her in her present economic straits.

RESULTS OF PAN-EUROPEAN CONFERENCE.—The third meeting of the pan-European committee, May 15-21, made it clearer than ever that M. Briand's plan of a pan-European union has dwindled to schemes for economic coöperation. To bring closer to practical realization the innumerable proposals presented, the conference brought into being an elaborate machinery of committees and sub committees, headed by a "coördinating committee" which is to begin work on July 6, coördinating and amplifying the conclusions submitted by the various special commissions. A committee on disposal of the wheat surplus was to meet on June 10. A meeting of cartel experts was set for June 24. Other committees were to deal with tariffs, Austrian finances, and problems of transportation. On the recommendation of the pan-European committee the League Council approved the establishment of an international farm credit bank at Geneva, and a convention establishing it was signed by thirteen states. It was expected to be in operation by next autumn.

On all these committees the Soviet Republic was represented, except the committee on unemployment, in which M. Litvinoff declared Russia was not greatly concerned.

RUSSIA OFFERS ECONOMIC TRUCE.—One definite benefit from M. Briand's pan-European scheme is that it has brought the Soviet Republic face to face with other European powers in discussion of economic problems which simply cannot be settled with Russia left out. While strict limitations were placed beforehand on the parts which Russia and Turkey were to be allowed to take in the May meeting of the pan-European union committee, the Soviet representative M. Litvinoff, soon made his proposals the center of discussion. Ready, apparently, for a working agreement between communist Russia and capitalistic Europe, M. Litvinoff proposed what he called an "economic non-aggression pact." According to the resolution which he presented, the European nations were to be invited to sign an agreement "solemnly confirming the principle proclaimed at the international economic conference in 1927 of the peaceful coëxistence of countries irrespective of their social, political, and economic systems." And the parties were to agree "not to adopt in their relations with each other any discrimination whatsoever. . . ."

M. Litvinoff's proposal was received with pleased surprise but also with some suspicion, and the best the committee would do was to refer it to its coördinating subcommittee for "further study."

AUSTRIA'S FINANCIAL STRAITS.—The present critical condition of Austria's finances undoubtedly contributed considerably toward making her amenable to reason in the matter of her trade agreement with Germany. While this latter question was before the League Council, Austria was at the same time applying to the international commission on Austrian loan control, in which France, England, and Italy have a decisive vote, for permission to negotiate a new loan of 100,000,000 *schillings*, or about $14,000,000. This was ultimately approved; and subsequently the Bank of International Settlements, at its first annual director's meeting on May 18, offered without direct solicitation to advance this sum immediately for the assistance of the Austrian State Bank. At the same time Austria was reported to have completed arrangements for an additional $21,000,000 loan, on permission already allowed her, with the Rothchilds and a group of French bankers.

PLANS FOR ARMS CONFERENCE.—With the the approval of the British cabinet, Foreign Minister Arthur Henderson of England on May 21 formally accepted from the League Council the office of president of the Limitation of Armaments Conference set for next February. Mr. Henderson accepted the office personally rather than as an official of the British government, and it is understood that he will assume the position whether or not the labor government remains in power. The council also decided definitely on Geneva as the meeting place for the conference. As for the date, there have been persistent rumors that France might propose at least a three-months' postponement, from February to perhaps June, which would give further opportunity for solving the Franco-Italian naval controversy and would put the conference at a time when the French parliamentary elections would be out of the way.

OPENING OF NARCOTICS PARLEY.—Representatives of fifty countries assembled at Geneva on May 27 for a conference on con-

trol of the manufacture of drugs and narcotics. At the head of the American delegation was John K. Caldwell of U. S. State Department, who was elected a vice-president of the conference—the first instance, it was believed, of an American government official assisting in such capacity in an assembly under league auspices. The chief work of the conference was to consider a draft convention on drug manufacture and traffic prepared by a subcommittee of the league opium board, the general aim of which was to put each country on a quota basis with government control. At the time of going to press no agreement had been reached acceptable both to the American delegates and to those of the other powers.

LONDON WHEAT CONFERENCE.—The London wheat conference, third international gathering to solve the problem presented by the immense world wheat surplus, met at London May 18-24, with delegates from the United States, Canada, Argentina, Australia, and the chief European grain-producing countries, including the Soviet Republic. In general the proposed remedies were along two lines—reduction of acreage, and stabilization of prices by establishing of quotas and placing the marketing under an international board of control. Save for an exchange of views, nothing definite was accomplished. The chief American delegate, Samuel R. McKelvie of the U. S. Federal Farm Board, declared that the United States would decline to join any international pool, but would market its surplus in an orderly way, without dumping. Russia, while accepting the quota system "in principle," declared that she intended next year to produce 36½ million tons, or 7 million more than last year, and that her quota must be on the basis of her pre-war production, when the Russian exports were twice that of any other grain-exporting nation.

EUROPEAN NATIONS

DOUMER ELECTED FRENCH PRESIDENT.—Between the opening of the French parliament on May 5 and the election of president by the Chamber and Senate meeting as a National Assembly on May 13, attention was concentrated in the close rivalry for the presidential office between Paul Doumer, President of the Senate and Conservative candidate, and Foreign Minister Aristide Briand, who entered the race on the appeal of a large group of Center and Left Center parties. On the first ballot there was no majority, M. Doumer receiving 442 votes to 401 for M. Briand, with about 50 votes for minor candidates. M. Briand thereupon withdrew and M. Doumer was elected by a vote of 504 to 334. Though seventy-four years of age, the new president is robust and energetic, a self-made man from Auvergne in Central France, who began life as a metal engraver but has been in national politics for nearly forty-five years.

M. Briand's defeat was accounted for largely by the rise of nationalistic sentiment and hostility toward his conciliatory policies. For a time it was expected that he would resign from the conduct of foreign affairs, but upon his return from the May meetings at Geneva, and upon the urging of both M. Doumer and Premier Laval, he decided to continue in control.

FRENCH LOANS IN EASTERN EUROPE.—Another extension of French credit to the Little Entente powers was completed on May 8, when it was announced that agreement had finally been reached on the terms of a $42,000,000 loan to Jugoslavia. The loan will be handled by a group of French bankers and more than half will be sold in the French market. As a condition of the agreement Jugoslavia gave assurances that she would assume the 5¼ per cent share of the debt of the old Ottoman Empire apportioned to her in the peace settlement.

FEARS OF GERMAN DEBT SUSPENSION.—It was generally assumed in European political circles that the June conference at Chequers, England, between the British and German premiers and foreign ministers, would certainly be seized upon by Germany as an opportunity for raising the question of suspending reparations payments. It is estimated that the fall in prices has increased Germany's debt burden at least 30 per cent, and that nothing, unless it were a huge loan to Germany from abroad, can prevent suspension of payments. With approval obtained at Chequers, Germany's next step would presumably be a formal request for the appointment of an advisory committee on her ability to pay, which would be presented at the monthly meeting of the World Bank board on June 10.

In case of a delay in German payments, France will undoubtedly take advantage of the debt suspension clauses in her own agreements with England and America, which give her the right, up to 1932, of partial or total stoppage of payments for three years.

ANTICLERICAL RIOTS.—In both Spain and Italy the month of May was marked by government measures hostile to the Catholic Church and by popular attacks on church organizations. In Spain, on May 10-11, church property was burned and plundered with a resultant damage estimated at over $1,000,000, the attacks being concentrated on the Jesuit College and Jesuit headquarters at Madrid. In other cities churches were burned and pillaged. Martial law was put in effect, and government proclamations laid the blame in common on Monarchist and Communist extremists, equally bent on discrediting the republic. From the Vatican came protests both at the destruction of property and the unwarranted action of the Spanish government in proclaiming religious freedom while the concordat is still in effect which makes Catholicism the official state religion. Separation of church and state, if desired, could be accomplished, it was held, in such a way as not to offend the Holy See.

In Italy the anticlerical movement took the form of bitter press attacks, followed by government suspension of the Catholic action organizations throughout Italy for alleged political interference, as well as Catholic institutions for the training of Italian youth.

NEW BRITISH LAND TAX.—The most notable feature of Chancellor Snowden's May budget speech in the British House of Commons was his land valuation proposal, as a preliminary to the levy of a ⅔ of 1 per cent tax on all land in the United Kingdom not used for agriculture. Such a tax, it is estimated, will yield $250,000,000 a year, though because of the tremendous task of evaluating 10,000,000 pieces of real estate beforehand, it cannot be put in effect earlier than 1934.

In defending his measure Mr. Snowden stood frankly on the socialistic doctrine of "the right of the country to ownership of the land," declared its effect would be "to cheapen land and throw it open to use," and prophecied that its advantages would begin to accrue the instant it became a law. The measure was approved in the Commons by a vote of 289 to 230, and as it has been made part of a finance bill it cannot be effectively fought in the House of Lords.

UNITED STATES AND NEW WORLD

AMERICAN DEFENSE IN "I'M ALONE" CASE.—The American reply to the Canadian bill of particulars in the *I'm Alone* rum-running case was completed in May, according to Washington reports, and ready to be forwarded to Ottawa about June 10. The defense is said to rest primarily on the contention that the vessel was in reality American owned—by the Danny Hogan liquor ring of New York—and that this would throw out the Canadian claim for damages.

The American reply is fortified with precedents holding that with the ownership of the vessel held in the United States there is no cause for damages. The case of the vessel *Fortuna*, seized by Great Britain during the War of 1812 when that ship was flying the Portuguese flag, is cited. The British maintained successfully that the mask of the Portuguese flag should be torn off and the case considered upon the basis of its real American ownership. The arbitrators held the *Fortuna* rightfully forfeited to Great Britain.

This precedent was used by Great Britain in the World War when British warships seized the *Kankakee* and other vessels of German ownership which were being operated by Hugo Stinnes under the American flag.—New York *Times*, May 27

UNREST IN ARGENTINA.—That political and economic disturbances are still threatening in Latin America is quite evident from the typical case of Argentina, where popular sentiment is turning rapidly against the provisional government set up recently by General Uriburu. Following an unexpected victory for the Radicals in the Buenos Ayres provincial elections of April 5, elections in the other three provinces were postponed, and it was only under strong pressure of public opinion that President Uriburu finally set the date for provincial elections to coincide with the national elections next November. In April Uriburu also reorganized his cabinet, excluding ministers closely connected with the Conservative party and giving it a more non-political character. Nevertheless the Conservative government apparently faces defeat in a fair election, and is threatened with a revolution—more serious than the last—should it seek by other means to retain its control.

COMMERCE CONGRESS IN WASHINGTON.—Of chief interest at the sixth biennial Congress of International Chambers of Commerce, which met at Washington, May 4-8, was the conflict between foreign delegates who sought to center attention on American high tariffs and cancellation of war debts, and the American delegates who strove with fair success to keep the Congress from definite action on these subjects. Attending the session were about 1,000 business men from thirty-five nations. President Hoover in his address of welcome appealed for reduction of armaments as a measure of economic relief, pointing out that the $5,000,000,000 annual European expenditure on war measures was twenty times the amount paid each year to America in debt settlements.

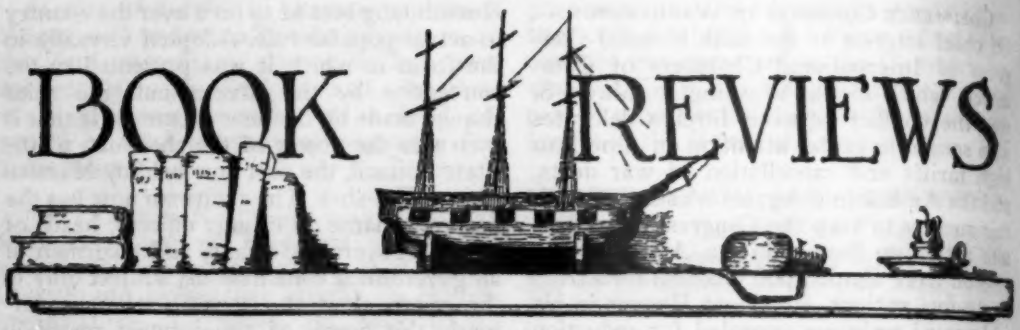
The congress passed a resolution favoring an international silver conference, and in its final resolutions made a mild approach toward the international debt problem, declaring that while the "integrity of international obligations" must be maintained, "observance of this important principle is not inconsistent with an impartial examination of the effects of these obligations on international trade."

FAR EAST

CHINA'S NEW CONSTITUTION.—The People's Convention assembled at Nanking by the Chinese Nationalist government accomplished during its session from May 5-17 the purpose for which it was brought into being—that of ratifying a provisional constitution which is to remain in effect until the Kuomintang sees fit to turn over the country to actual popular rule. Adopted virtually in the form in which it was presented to the convention by the government, the chief change made by the new document is that it increases the power of the chairman of the State Council, the post now held by Marshal Chiang Kai-shek. The chairman now has the power to name all cabinet officers, heads of the five governing Yuans, and chairmen of all government commissions, subject only to the approval of the council, whereas formerly this power of appointment rested in the council as a body without specific direction from the chairman. The constitution went into effect on June 1.

THE SOUTHERN REVOLT.—During May the movement in Southern China against the Nationalist government gathered strength from the adhesion of former foreign Minister Eugene Chen and a number of other political and military malcontents; while at the same time the mutiny against the Canton leaders of troops at the Whampao Military Academy and elsewhere indicated that there was no great unity in the southern camp. The whole movement was avowedly directed not against the Central government as such, but against the alleged autocratic methods of President Chiang. While there were reports of large troop movements south of Hankow, the Nanking leaders appeared less concerned over the disturbances in the south than over the nearer threat of banditry and rebellion in the central provinces.

BOOK REVIEWS



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MY EXPERIENCES IN THE WORLD WAR. By General John J. Pershing, U. S. Army, Commander in Chief, American Expeditionary Forces in France, 1917-1920. New York: Frederick A. Stokes Company; $10.00, 2 vols.

REVIEWED BY BRIGADIER GENERAL GEORGE RICHARDS, U. S. MARINE CORPS.

General Pershing's personal narrative already has been made familiar to the American public. Its serial publication in syndicated newspapers has given to everyone interested in the story of American activities in the World War a half hour daily to become better acquainted with that great personality who led our military forces in France. His book is now at hand, a modest portrayal, where reading between the lines we can discern the manifold gifts of this American leader. It is in two sizable volumes of some 800 pages, a collection of the syndicated newspaper articles but revised and enlarged. It is accompanied by sixty-nine illustrations and many useful maps and charts, all pertinent to the narrative.

General Pershing is not revealed as the strategist, or, as the tactician concerned in the disposition of his troops, the intricate management of their supply and the countless other details of military administration. Rather his outstanding characteristic, born of his service in France, is in the rôle of the master diplomat. His free and frank disclosures of his problem in relation with those who commanded or controlled the other armies associated with us are most instructive. His struggle there was not so much one to maintain the prestige of his own country, consistent with the success of our arms in France, as it was to maintain that highest of morale and maximum of efficiency to be expected of American troops fighting for their country under the American flag. True, General Pershing was required by his letter of instructions from President Wilson to do this very thing. He was definitely told that his guiding principle in his conduct in France was to exercise, consistent with due hope for success, an "independent command"; to keep his troops "a separate and distinct component of the combined forces, the identity of which must be preserved." But none the less he was at the same time directed by the War Department to "coöperate with the forces of the other countries employed against the enemy."

This story of General Pershing's experiences in France, is, as indicated, one related with modesty, clearness, and candor. The reader is not permitted to underestimate the resisting factors that beset him. But that reader is not permitted to infer that they were wholly confined to French over-seas territory or to the conduct of the representatives of the European nations there associated with Americans. There were equal difficulties at home. They lay at the bedrock of General Pershing's troubles. In their relation to his problem in France they were not the least of his difficulties. The leaders of these of our so-called allies in France, it is true, many times failed to see the wisdom of the American point of view as emphasized by President Wilson's instructions to General Pershing. The peril that confronted them with the early successes of the German drive of 1918 had

affected their judgment. It was not that they opposed the creation of an independent army. Their lines were breaking; they wanted men to stop the gaps.

One of the most striking features of the Pershing narrative concerns his recital of the many evidences of the confidence and support he was vouchsafed by the more responsible representatives of our government at home. This is a new relationship, one that did not distinguish our conduct of former wars. And best of all, credit is freely given by General Pershing to his associates and subordinates of the United States Army in France. He does not fail to bestow that meed of deserved praise. Nor does he overlook the conduct of those to whom he was responsible for his trust, viz.: President Wilson and Secretary of War Baker. The kind of loyalty the Pershing narrative bespeaks is that of which so many of our prominent naval writers have many times disclosed in the pages of the PROCEEDINGS of the U. S. Naval Institute. The loyalty that is worth while, the loyalty that brings into being that loyalty of our subordinates, is the kind of loyalty we first show to them. It does not beget lip service, it brings forth loyalty that comes from the heart. Our one-time Secretary of War, Newton D. Baker, of Ohio, never wavered in his faith in the chosen military representative abroad. In all the difficult situations that confronted General Pershing, the Secretary of War, and the President were unstintingly supporting him.

It was for the purpose of the expected beneficial moral effect upon the nations theretofore opposing the Central Powers that the first contingent of the American Army was sent abroad in 1917. This was the reason given in connection with the urgent request to that effect by Marshal Joffre of the then French Military Mission in the United States. Once that contingent was there for such an object it was expected that in due season it would be followed by the larger army for the physical or military effort of America. But in 1917, according to the chief of staff of the War Department, there was no plan evolved for the dispatch of such a major force. General Pershing was not slow to insist that plans be made. An army of a million men was needed at the earliest moment. A program should be set for their transportation, determined by the availability of shipping facilities. That was the principal question—the availability of shipping facilities. But the schedule set fell hopelessly behind. With this condition the prospect of soon creating that "independent army" of a million men in France, all under the American flag, disappeared. It was the fact that such an army was not there on the ground that lay at the foundation of General Pershing's difficulties in his relations with our allied associates. With such an army in being on French soil no objection would have arisen as to its independence. Neither General Pershing on the other side of the Atlantic nor anyone on this side of those waters could deliver that army. The ships to transport the men and the guns and to follow up with the needed supplies were lacking, feverishly though America did build. This deficiency was neither Pershing's fault nor that of the allies. As we read the Pershing recital of the claims then made by our associated peoples of the World War in the emergencies before them we should not forget one important fact than his narrative brings out. It ought to have been given a greater emphasis. Before General Pershing was finally successful in securing from England those ships under the British flag that brought the greater part of his American Army to France, our Shipping Board at home, by some strange freak of mentality, had diverted newly built American vessels to participate in the development of our South American trade. As late as August, 1918, we find General Pershing making a strong protest to Secretary of War Baker, saying "I firmly believe, Mr. Secretary, that if these interests (i.e., the Shipping Board) could realize the vital need for more tonnage they would stand ready to meet it as far as possible, even to the abandonment of certain fruit and other trade with South America."

This troop-ship problem and its associated matters are of especial interest to the naval reader. With that final solution of the major question through the coöperation of Old England in giving unstintingly her ships to the cause, Pershing secured his American Army to crown our arms with success. The relationship of this problem of over-seas transportation to that naval supremacy over the Central Powers seems with other things to be forgotten. The command of the seas did not belong to the enemy. This, as a fea-

ture of the Pershing narrative, cannot fail to be classed by us as an omission. It, as such, is of some concern to the naval student. It cannot be but disappointing to him to find so scant a mention of the contribution of the United States Navy to the successful outcome of the World War. A very prominent naval officer once said publicly that the fighting edge of any nation was its man power, meaning thereby the man with the rifle, the United States infantry. All other components of our national defense are but auxiliaries to his efforts. These are cavalry, artillery, aircraft, and other organizations of the United States Army. And this naval officer equally classified the Navy in the same relation as but an auxiliary to the infantry to help to clear the way for this fighting man. For all auxiliaries are merely either to clear that way or to furnish to that man better eyes to see.

The World War did close with a very happy relationship between the several branches of our national defense, a condition deserving of perpetuation. It was President Wilson's successor in office who once drew attention to this situation. President Harding wrote to this writer in 1923 (See U. S. Naval Institute PROCEEDINGS, November, 1928, page 1029) as to "the commendable amiability that marks the relationship among the different branches of the service." He recalled there that "this very sentiment of general coöperation and mutual helpfulness was precisely the factor that so greatly increased the efficiency of all branches of the service during the World War." Forgetfulness, however, is a very common fault of this day and generation. The present, with its engrossing occupations, sometimes shuts out the past. Modern life, with its swift intensity, tends to dull our memories. Through some regretful oversight that none need attempt to fathom, the contribution of the United States naval service to the success of the armies of the United States in France is omitted from the Pershing narrative. Now the Navy's part in the struggles of the World War was not confined solely to the waters of the Atlantic. Quite a considerable body of naval personnel went to make up the organization of a very distinguished element of the Pershing command —namely, the 2d Division. This outfit was recognized as regular in distinction from the temporary forces. There was yet another unit to the Pershing command having the same attributes, equally regular, viz., the 1st Division. All of its components were furnished by the regular Army. In those struggling days of 1918 there existed a commendable rivalry between these two outstanding units. That rivalry, it is believed, contributed to the success of both organizations. If the 1st Division was given a task that was accomplished—and they were never given one in which they failed—this circumstance did not fail to stimulate the 2d Division to attempt the impossible and likewise to succeed. The naval student of the Pershing narrative fails to find equal prominence given there to the accomplishments of each of these important elements of the American Army in France. The Pershing work devotes considerable of its pages to tell the story of the operations of the 1st Division at Cantigny while few in comparison are given to the account of the operations of the 2d Division in and about Belleau Woods, though the commendatory statements that General Pershing made at the time with regard to these operations are gratefully recalled by the naval service.

We of the naval service cannot but remember with deep gratitude those of our service who fought under Pershing's leadership. If the failure to devote equal space to their achievements as that afforded in the description of the Cantigny operations of the latter part of May strikes us with a jolt, we can for solace turn to our present-day friends, who were once our enemies, the Germans themselves. They, above all, have the true perspective; they can give disinterestedly an expression of the relative value of the American operations at Cantigny and in and about Belleau Woods. Colonel Ernst Otto of the Historical Section, German Staff, has contributed some evidence upon this question. Here are his words:

> The American 1st Division had taken up its position in a relatively quiet sector. The 3d Division had not yet been tested as a whole although one of its units, the 7th Motorized Machine-Gun Battalion, had taken a successful part in the Battle of Chateau-Thierry during the night of May 31/June 1. It was reserved for the 2d Division, therefore, to give the answer to the then all-important question: How will the American troops behave in a pitched battle? Therein lay the significance of the battles for the possession of Belleau Woods.

Again and from the same source—the Germans—this writer would refer to the published statement of Colonel Victor Keller, Chief of Staff of General von Gall-

witz's group of German armies (New York *Times*, May 3, 1931). This group was massed against Pershing's American Army at the St. Mihiel salient and later in the Meuse-Argonne. Colonel Keller refers to the situation existing at St. Mihiel before the American attack developed in the Meuse-Argonne. There was in the German lines the question as to where to expect, after St. Mihiel, the next attack of the American Army. Here are Colonel Keller's words:

> It was not until we had ascertained that the 2d Division, regarded as being good, had been relieved here . . . that additional interest had to be paid (by the Germans) to the right wing of the 5th Army on the west of the Meuse.

This signified that the Germans once they had noticed that the 2d Division was removed from their immediate front looked to an expected attack elsewhere.

Withal, General Pershing has given to America a fine story, good reading, not for the general public alone but the military as well as the naval service. The problems of the Army he solved are instructive to the naval student. The Germans themselves have said that General Pershing was the right man in the right place. It is doubtful that anyone can point out any errors of fact in his narrative. What this writer has drawn attention to are merely what many of the naval service will feel to be errors of omission. General Pershing has given to us an unpretentious narrative of service not alone in behalf of the American nation but for the world. He has produced a great book for our deliberate reading. He deserves the congratulations of all of us for his contribution to the annals of history.

RESISTANCE OF SHIPS AND MODELS. By N. W. Akimoff. Rome: Library of Science and Letters. 1930. 16s.

REVIEWED BY LIEUTENANT F. A. TUSLER (C.C.), U. S. NAVY.

Mr. N. W. Akimoff needs no introduction to the scientific world by virtue of his previous valuable contributions on such diverse subjects as dynamic balance, vibration problems in general, propeller theory, and higher mathematics. One is not surprised, therefore, to find him attacking the somewhat baffling problem of the resistance of ships, about which, even today, there are so many conflicting theories.

The classical method, first enunciated by William Froude in 1874, of estimating the resistance of a full-sized ship from the results of model resistance experiments, is still used by the world's model tanks in estimating the effective horsepower (towrope horsepower) of the ship. It will be recalled that, according to this theory, the total resistance of a ship (or its model) is made up of frictional resistance and residual resistance, the latter including wave-making, eddy-making, and streamline resistance. For geometrically similar ships at "corresponding speeds," the residual resistances are to each other as the cubes of linear dimensions, the corresponding speeds being in the ratio of the square roots of linear dimensions. Theoretically the residual resistance obeys the law of dynamical similarity. On the other hand, the frictional resistance does not follow this law and must therefore be directly calculated for both the model and the ship by means of the empirical formula—$R_f = fSV^n$ where, f is the coefficient of friction (depends on length of ship), S is the wetted surface, V is the velocity, and n a variable exponent, but usually taken as about equal to 1.83. The procedure in estimating the total resistance of the ship from the total model resistance is briefly as follows: the model is run at its corresponding speed; its total resistance is measured; the frictional resistance of the model for this speed is directly calculated and subtracted from the total model resistance, leaving the residual resistance; the residual resistance of the ship is then equal to λ^3 that of the model, λ being the ratio of linear dimensions of ship to model; the frictional resistance of the ship is then calculated directly for its corresponding speed and added to the residual resistance, this sum being the total resistance of the ship. With certain exceptions, there has always been more or less discrepancy between the estimated effective horsepower based on the estimated resistance and the results obtained on the trial trips of a vessel. This has been taken care of by the somewhat elusive "thrust deduction factor" and the "wake fraction."

Recently there has been a growing feeling in some quarters that the above method was sadly in need of overhaul, the calculation of frictional resistance receiving most attention. Among the schemes advanced are those involving some function of Reynolds number $(\frac{v}{v.1})$ in the calculation of frictional resistance; others lump all forms of

resistance together, depending altogether on a single empirical formula for total resistance, e.g., that proposed by Mr. A. L. Ayre. The method of computing the total resistance of a ship proposed by Mr. Akimoff belongs to the latter class, although, by making certain assumptions as to the identity of the nature of frictional and residual resistance, he has been able to derive his formula for effective horsepower by means of dimensional equations. His formula for effective horsepower is:

$$\text{E.H.P.} = \left(\frac{V}{A}\right)^3 \times \text{𝔐}$$

"where E.H.P. is the towing horsepower, in British H.P.

V is the velocity in knots

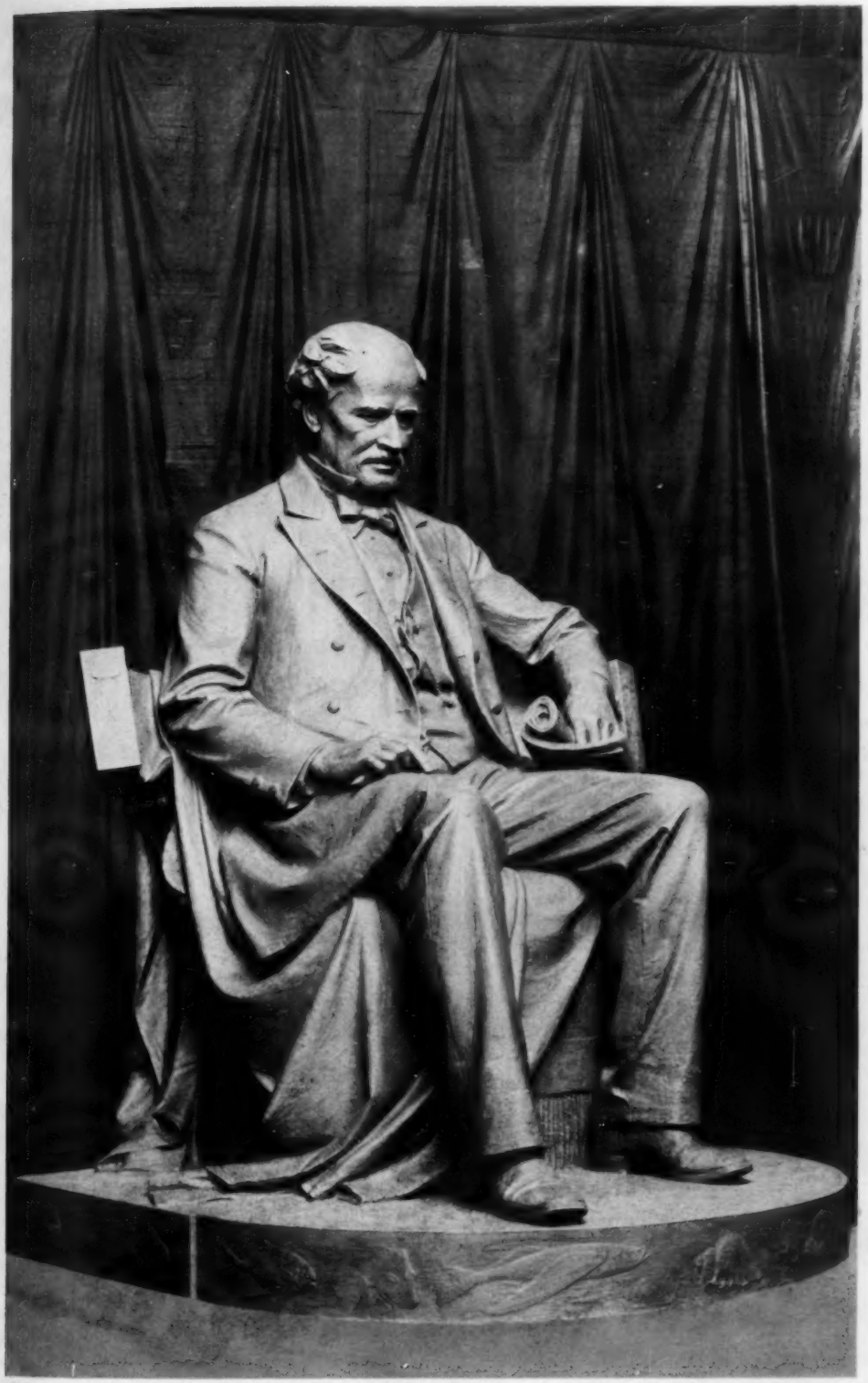
𝔐 is the area of midship section in square feet"

and "A is a *quasi-constant*, varying with the form of the hull, with the ratio L/B (relative length), also with the ratio $V/\sqrt{L}$ (or simply with the speed), for a given hull."

The above equation is quite similar to that in use for many years involving the "admiralty coefficient."

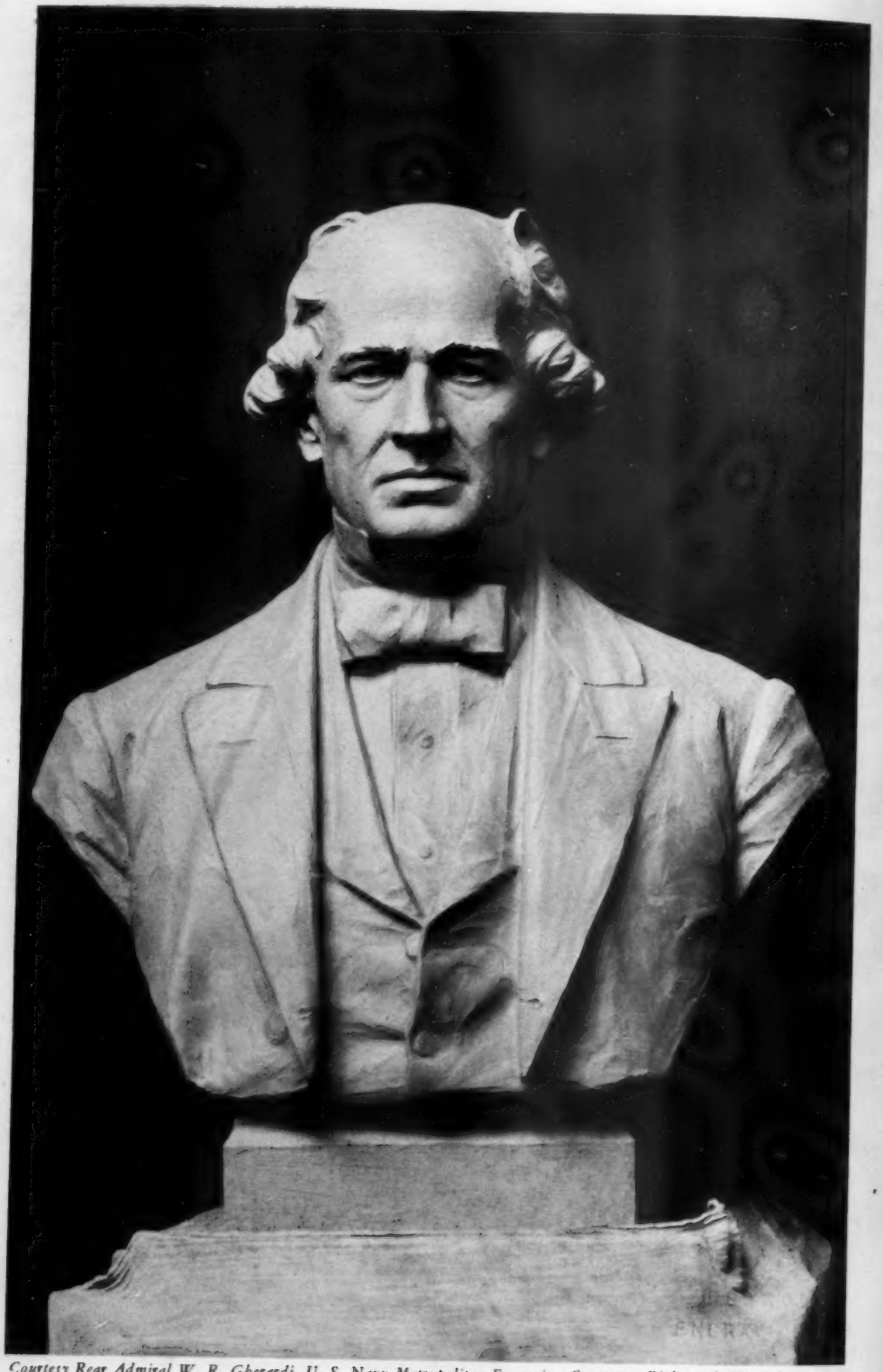
So far the variation of A has been determined only for the ratio $V/\sqrt{L}$ and for speed, no account having been taken of the variation of the form of the hull, which of itself is usually considered to have an important bearing on resistance. This would seem to weaken somewhat the value of the equation as an independent means for the estimation of effective horsepower (tow-rope horsepower). When used to estimate the e.h.p. of a ship from model test data, the method is that of determining the A's resulting at the "corresponding speeds" of the model, after which the e.h.p. of the ship can be calculated directly for each speed of the ship. Mr. Akimoff claims his method results in more reasonable thrust deduction factors than does the classical method. Which is nearer the truth can probably be determined only by one of two methods: full-sized towing experiments (the famous *Greyhound* experiment of 1871 being the first and last of this nature); or model tests using two models of different size.

Mr. Akimoff has raised many interesting questions, regarding which most investigators will, no doubt, take issue. His observations on the mechanism of wake phenomena should prove instructive to nearly all. Altogether, the volume is quite readable since it contains a minimum of mathematical theory.



Metropolitan Engraving Company, Richmond, Virginia

MATTHEW FONTAINE MAURY, PATHFINDER OF THE SEAS
This is a part of the monument erected to Maury in Richmond, Virginia, F. W. Sievers, sculptor.

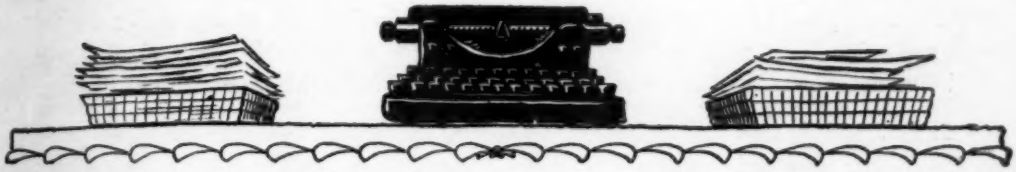


Courtesy Rear Admiral W. R. Gherardi, U. S. Navy Metropolitan Engraving Company, Richmond, Virginia

MATTHEW FONTAINE MAURY

This bust was unveiled in the Hall of Fame, New York University, May 14, 1931.

SECRETARY'S NOTES



Captain A. T. Church, who has been the Naval Institute's secretary-treasurer for the past year, has been transferred from the Postgraduate School to duty as manager of the Bremerton Navy Yard. The Board of Control, regretting his loss to the Institute, could only accept his resignation with sincere regret. Most of our readers probably already know that Captain Church has the distinction of having served as editor of both the *Journal of the American Society of Naval Engineers* and the Naval Institute PROCEEDINGS. The incoming secretary-treasurer has had the privilege for the past year of serving on the editorial staff under Captain Church. He can only hope that the association will enable him to bring with him something of the sound judgment and keen insight that his predecessor has given to the Institute.

Maury In the Hall of Fame of New York University there was unveiled, on May 14, a bust of Matthew Fontaine Maury. On that occasion Rear Admiral W. R. Gherardi, Hydrographer of the Navy, made the following address:

The benefits which accrued to the world from the work of Matthew Fontaine Maury were not limited to his day and generation but remain a contribution to its welfare now and for all time. The memory of the practical accomplishments of this great naval scientist is held in the highest esteem by the Navy of today.

The popular title of "Pathfinder of the Seas" truly expresses the feeling of mariners with regard to Maury. His researches, while an officer of the United States Navy, in the spheres of hydrography, meteorology, and oceanography, remain an everlasting contribution and incentive to the Hydrographic Office of the Navy in its endeavor to promote the security of shipping and to safeguard the lives of seamen and airmen. Maury was early recognized as an authority and his fame spread over the whole civilized world. He became an international figure—the world's greatest oceanographer.

Although the size, speed, and means of propulsion of modern ships are entirely different from those of the days of Maury, the fundamental principles which he enunciated are the groundwork upon which hydrographic activities are carried on to this day. Pilot charts and sailing directions are produced on a basis taken from his brilliant researches in the early part of the nineteenth century.

The passing of time has heightened the realization of the benefits provided from the work which he initiated and has served to strengthen the affection which all seamen and navigators have for his memory. He remains to this day the great American figure in the realm of nautical science. The stimulus which was given by his investigations and writings on these matters has lived in the form of practical accomplishments which serve to protect and assist the mariners of all nations.

As the Hydrographer of the United States Navy, I feel deeply gratified that the American people have recognized the services and abilities of Matthew Fontaine Maury and that by his inclusion in the Hall of Fame at this University, they have done honor to his memory and his brilliant achievements for mankind.

Special Number As has been the case for some years past, the August issue will devote considerable space to articles and photographs that are particularly applicable to the aviation work of the Navy.

Membership It is only through the efforts of members of the Institute that the merits of the PROCEEDINGS can be brought to the attention of those in and out of the service who are interested in the "advancement of professional, literary, and scientific knowledge in the Navy." If our membership will, whenever opportunity offers, tell others of the advantages of joining the Institute, our organization will surely widen its field of usefulness. The secretary welcomes nominations for membership. He feels that with the continued assistance of those who are already members of the Institute, the PROCEEDINGS will continue its slow but healthy growth.

China Service of the "Constitution" Lieutenant Commander Franklin Bache Huntington, U. S. Naval Reserve, of Philadelphia, furnished us the following account of the dinner set of the *Constitution.*

The china service of the frigate *Constitution,* which was made in France in the early part of the last century, after having been virtually lost for some sixty years, has been unearthed.

There is quite an interesting story to the finding of the historic china by Mr. J. A. Schwarz of Philadelphia.

When the old *Constitution* was dismantled at the Brooklyn Navy Yard, after the Paris Exposition in the seventies, the china service was not in its accustomed place in the dining-room. This was soon forgotten, despite the fact that the service was known to be a valuable one. In the early days of the Navy, china was used exclusively instead of silver, and every frigate tried to have the most beautiful and elaborate set.

Now, after some sixty years, it appears that the last captain took possession of the set, believing that it was his by right. For that matter, it may have been indirectly given to him, though there is no record of it at Washington. He in turn presented the dishes to Mrs. Walters of Front and Christian Streets, this city, Mrs. Walters kept a sailors' boarding-house, and the officers and crew of the *Constitution* made it their headquarters when in Philadelphia.

The china set was immediately placed on the table and remained in use for some considerable time, or at least until part of the cups, saucers, and dishes were broken and thrown in the ash heap. The parted set lost its attractiveness, and the dishes were packed away in the attic. Not knowing the value of her possession, Mrs. Walters started to give it away, a piece at a time, for Christmas presents.

A friend of Mr. Schwarz received one of the dishes and in that way the present owner, who collects curios and relics for his private collection, learned of the existence of the set. He purchased the dishes and platters that Mrs. Walters still had packed away and traced the whereabouts of the remainder. With the exception of a cup and saucer, a gift to an Ohio clergyman, who could not be traced, what remains of the set is now complete.

Curators who have examined the collection say it is authentic and that it was made in France in the neighborhood of 1805. The bitterness against England at that time would not permit such purchases to be made in that country.

The pieces are hand painted with a picture of the frigate. Upon examination one will find that no two paintings are alike. The large platters and soup tureens have pictures of the ship on both sides, but the plates only on one. In the collection there are an ice pitcher, a celery dish, two soup tureens, a large platter, three small platters, and several soup dishes. The rest of the set consists of plates of various sizes.

LIST OF DISHES

FRIGATE *Constitution*

13 pieces—10 " flat plates
17 pieces— 8 " flat plates
8 pieces— 7½" soup plates
6 pieces— 9½" soup plates
3 pieces—13 " platter
1 piece —16 " platter
1 piece —10 " gravy bowl with bottom
1 piece — 9½" high water pitcher
2 pieces—11½" oval covered vegetable dish (Tops are original—bowls replaced)
1 piece — 7½" round covered vegetable dish
1 piece — pickle leaf dish

54 pieces—Total

Mr. Huntington suggested that he would be willing to negotiate for the purchase of these dishes for the Naval Historical Foundation. Unfortunately it has been found that neither the Historical Foundation nor the *Constitution* has funds which can be used to restore this china to its place on the old frigate.

South American Division

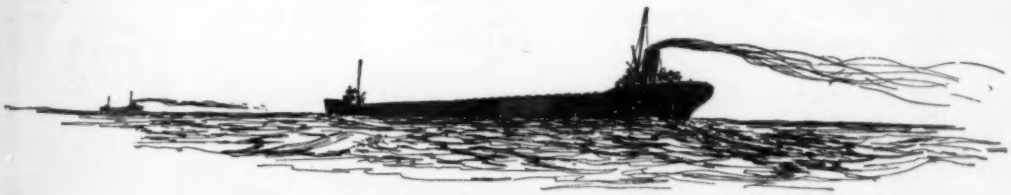
The British Admiralty recently announced the revival of a South American division, under command of a commodore. Incidentally the commodore in question has just been captain of the Royal Naval College of Greenwich. Although the South American squadron was abolished ten years ago there has been a British cruiser off each coast much of the time. Evidently the efforts of the Prince of Wales to promote trade are being supported; and our over-seas cousins seem to attach considerable importance to "showing the flag."

What Do We Want

The Naval Institute belongs to its members. The Board of Control and the editorial staff will endeavor to give the members what they want in the PROCEEDINGS, *if* those wants can be learned. The success of our publication depends upon the support received from the Institute membership. This means not only reading the monthly issues but also healthy criticism, material, suggestions, pictures, and the like. If articles of a certain nature are desired, the secretary would like to know; or if too many are published on one subject, he would like to know that too. The professional notes are gleaned from many papers, magazines, and pamphlets. If any member has ideas as to the scope to be covered by those notes, or periodicals that should be habitually scanned, or any other pertinent matter, it is hoped that he will submit the suggestions for consideration.

Royal United Service Institution

The Royal United Service Institution that commemorates its centennial anniversary at a reception on the second of this month, is an organization that strives for the "the promotion and advancement of naval and military science and literature." American naval officers have read with interest and profit the pages of its *Journal* since publication began in 1857. The United States Naval Institute, with much the same mission in the American Navy that the Royal United Service Institution has in Great Britain's armed forces, wishes its older contemporary continued prosperity and usefulness.



ADMIRAL FRANKLIN BUCHANAN

Fearless Man of Action

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Associate Professor, U. S. Naval Academy

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The first American to set foot on Japanese soil and an important figure in the negotiations which resulted in opening the ports of Japan to the commerce of the world.

Commander of the first steam vessel to cross the Pacific.

Commandant of the Washington Navy Yard under President Lincoln.

Commander of the Confederate ram *Virginia* (formerly *Merrimac*), the first ironclad vessel ever to engage in battle, and which in a single day revolutionized naval warfare.

Senior admiral of the Confederate Navy.

President of the Maryland Agricultural College, now the University of Maryland.

This book is for sale by the Naval Institute at list price, $3.50 (5 per cent less to members).